South 4 Group Fire at PNO

TPC Group LLC

August 5, 2020

90096255

Table of Contents

List of Figures

List of Acronyms

ACM – Asbestos Containing Materials
CC4 – Crude C4, the raw material for the butadiene separation process
CO – Carbon Monoxide
CTEH – Center for Toxicology and Environmental Health
EOC – Emergency Operations Center
EPA – US Environmental Protection Agency
FOSC – Federal On-Scene Coordinator
FRP – Federal Response Plan
GLO – Texas General Land Office
IC – Incident Commander
ICS – Incident Command System
JWWTP – Joint Wastewater Treatment Plant jointly owned by Lion Elastomers, Huntsman (Indorama) and TPC
LEL – Lower Explosive Limit
LOSC – Local On-Scene Coordinator
MTBE – Methyl tert-butyl ether
NCP – National Contingency Plan
NIIMS – National Interagency Incident Management System
NMP – n-Methyl-2-pyrrolidone solvent
NOx – Nitrogen Oxides
PACM – Potential Asbestos Containing Materials
PFOS/PFOA - perfluoroalkyl substances used in firefighting foams
PIO – Public Information Officer
PM – Particulate Matter
PNO – Port Neches Operations located at Spur 136 and Highway 366 in Port Neches
PRP – Principal Responsible Party
RRC – Texas Railroad Commission
SCAT – Shoreline Cleanup and Assessment Technique
SO2 – Sulfur Dioxide
SOSC – State On-Scene Coordinator
TCEQ – Texas Commission on Environmental Quality
TPC – TPC Group LLC
TRG – The Response Group
UC – Unified Command
USCG – United States Coast Guard
VOC – Volatile Organic Compounds

1. Introduction

This report is intended to provide an overview of the incident that occurred at the TPC Group LLC Port Neches Operations facility (PNO or facility) on November 27, 2019 and provide information on the actions taken to respond to the event and ultimately stabilize the facility.

2.Executive Summary

At approximately 01:00 on November 27, 2019, an explosion and fire occurred at the South Group processing unit at the TPC Group LLC PNO facility due to a loss of containment on a transfer line between the S4D4A and S4D4B columns. Emergency response personnel from several organizations including Jefferson County and several members of the mutual aid organization, Sabine Neches Chiefs Association, responded to the fire. Jefferson County Office of Emergency Management, the US Environmental Protection Agency (EPA), Texas Commission on Environmental Quality (TCEQ) and PNO established a Unified Command (UC) to address the incident through a coordinated response structure. More than twenty agencies and organizations participated in the response and monitoring efforts.

An extensive network of real-time and analytical air monitoring stations was quickly established by Center for Toxicology and Environmental Health (CTEH) and agency contractors to monitor around the facility and throughout the community. They monitored for total Volatile Organic Compounds (VOCs), Butadiene (BD), % Lower Explosion Level (LEL) and particulate matter (PM) utilizing portable analyzers that provided real-time results. Several stationary sampling stations were established around the facility and in the community. These collected 24-hour samples, which were sent daily to a certified laboratory for analysis to identify the quantity of several constituents that were measured, including many VOC's, PM and asbestos.

The primary fire was extinguished on November 30 at 09:30, although several small fires were allowed to burn in order to consume the flammable gas leaking from indeterminable sources and extinguish themselves. The last fires were extinguished on January 4, 2020. As the firefighting response ended, PNO shifted to a monitoring and mitigation focus. Drones were flown several times per day when possible to provide aerial visuals and infrared scans of the facility, equipment and the canal. The flights helped identify continuing leaks, monitor the safe state of the equipment, assess damage and identify issues that needed to be addressed.

During the period from the initial addition of water to the fire, until a generator restored power at the joint wastewater facility, the firefighting water and floating hydrocarbons collected in the ditches and containment at the PNO facility until they became full and overflowed. The runoff primarily discharged through Outfall 201 to the Outfall Canal, which is the same canal into which the treated waste water from the Joint Wastewater Treatment Plant (JWWTP) discharges. Response Teams and equipment were established prior to discharge from Outfall 201. A series of booms and response equipment including vacuum trucks were set up to collect and containerize contaminated material.

A multifaceted Shoreline Cleanup and Assessment Technique (SCAT) Team was established, which included response and agency personnel. A SCAT was performed, and the canal was divided into five sectors, A-E, to ensure monitoring and response actions prevented hydrocarbons from reaching the Neches River, approximately three miles away. During the response period, much of the water from the Outfall Canal was directed to flow through the tertiary treatment system to provide the greatest treatment and residence time prior to discharge to the Neches River.

PNO transitioned from firefighting to monitoring and mitigation as the fires were extinguished on January 4, 2020. PNO and contract personnel assessed the facility, identifying leaks and safety concerns, then systematically developed plans and protocols to mitigate leaks, restore necessary infrastructure and de-inventory the facility. Air monitoring continued at the PNO facility and throughout the community. Monitoring and cleanup activities on the canal also continued. A plan was developed and implemented to remove blast debris that potentially contained asbestos in the community and within the facility.

UC monitored the situation and adjusted the organization accordingly. As the threat of further off-site impact from the incident was significantly reduced and the focus of stabilizing the on-site equipment continued, the U.S.EPA transitioned the long-term response and cleanup oversight of the UC to TCEQ on December 13, 2019. On January 30, 2020, TCEQ disbanded the UC, relinquishing incident command to TPC. The event was declared over at 11:13 on March 30, 2020, when the last leaks on two tanks were stopped.

From November 27, 2019 to January 30, 2020, daily air monitoring and analytical air sampling air quality evaluations were conducted by members of the UC. On December 11, 2019, UC approved an air monitoring and sampling reduction plan to focus community monitoring and sampling within a 1-mile radius from the facility based on progress made at the site and the results of both air and water monitoring. On December 19, 2019, a similar air monitoring and sampling reduction plan was approved by UC to focus community monitoring and sampling within a 0.5-mile radius from the PNO facility. On January 30, 2020, TCEQ dissolved the UC, again based on progress made at the site and the results of both air and water monitoring. The agencies established criteria for notifications based on monitoring results. TPC continued to man the Incident Command, coordinating the response and de-inventory of the site. Based on the conditions at the site and the results of community air monitoring results remaining below action levels, UC approved a final community air reduction plan, which reduced air monitoring and sampling to inside and along the fence line of the facility. CTEH personnel concluded routine community air monitoring and sampling at the end of the daytime shift on January 30, 2020. Since January 30, 2020, CTEH has continued air monitoring and sampling along the fence line and inside the boundaries of the PNO facility.

From the period of November 27, 2019 through January 31, 2020, CTEH collected 261 surface water samples from 20 locations and eleven drinking water samples from one location. *See* Appendix G. Initial surface water sampling was conducted twice daily from November 28, 2019, through December 11, 2019. Based on the review of sampling results which indicated no impacts to the surface or drinking waters and no ongoing releases of water from the site, UC approved the Environmental Sampling Reduction Plan on December 11, 2019. Asbestos analysis was discontinued, and surface water sampling was reduced to daily sampling from December 12, 2019, through December 19, 2019. On December 20, 2019, TCEQ verbally approved adjusting sampling efforts to weekly sampling events, which were performed until January 31, 2020. Water samples were taken from locations upstream of the incident discharge facility at the Indorama dock, Collier's Ferry Park in Beaumont, Texas, and the PNO facility water intake location on the Neches river, as potential baseline sampling locations to aid in the evaluation of facility-specific sampling data. Surface water samples were collected from permitted outfalls for the PNO facility and neighboring facilities, water retention facilities and effluents, all canals associated with the JWWTP runoff, the raw water intake for the city of Port Neches (WS007), and the final permitted discharge location. Drinking water samples were collected from a faucet inside the City of Port Neches Water Facility from December 17, 2019, through January 19, 2020.

TPC instructed CTEH to conduct analytical air sampling and water sampling to test for potential asbestos containing material (PACM) since infrastructure within the PNO facility was reported to contain asbestos containing material (ACM). Abatement contractors began collecting the material in the community and at the facility on December 1, 2020. All debris collected was handled as ACM. PNO established decontamination stations to decontaminate any items to be used or removed from the facility. CTEH stationary air sampling found no detections of asbestos fibers. CTEH's water sampling found not detections of asbestos fibers in the Neches River. *See* Appendices F and G.

The waste generated during the event included PACM, recovered hydrocarbon and water from the cleanup of the Outfall canal, oil-contaminated solids, such as booms and other debris from the cleanup efforts and hydrocarbons collected from the facility sumps. PNO contained, sampled, and identified disposal facilities for these materials.

Wastes Generated at the time of the event have been sent offsite for disposal or recycle pursuant to applicable regulatory requirements. Activated carbon and scrubbing solution for controlling emissions from the waste storage containers were generated by the response.

3.Background

3.a. Facility Location

The PNO facility is in the eastern section of Port Neches in Jefferson County approximately 20 miles inland on the Neches River. See the *Incident Overview Map* in Appendix A, Figure1. The facility is specifically located on Highway 366 at Spur 136 on approximately 218 acres.

Lion Elastomers LLC has a facility adjacent and directly north of the PNO facility. MOTIVA Enterprise occupies the northeast sector of the junction of Highway 366 and Spur 136, across the street from the PNO facility. Indorama owns and operates the facility located to the south of Highway 366, to the south and southeast. They operate the JWWTP that is co-owned by Lion, Indorama and PNO.

The PNO Dock is located approximately one-half mile north of PNO. It consists of two separate docks that can load and unload 1,3 butadiene, Crude C4 (Crude butadiene) and Raffinate.

3.b. Facility Background

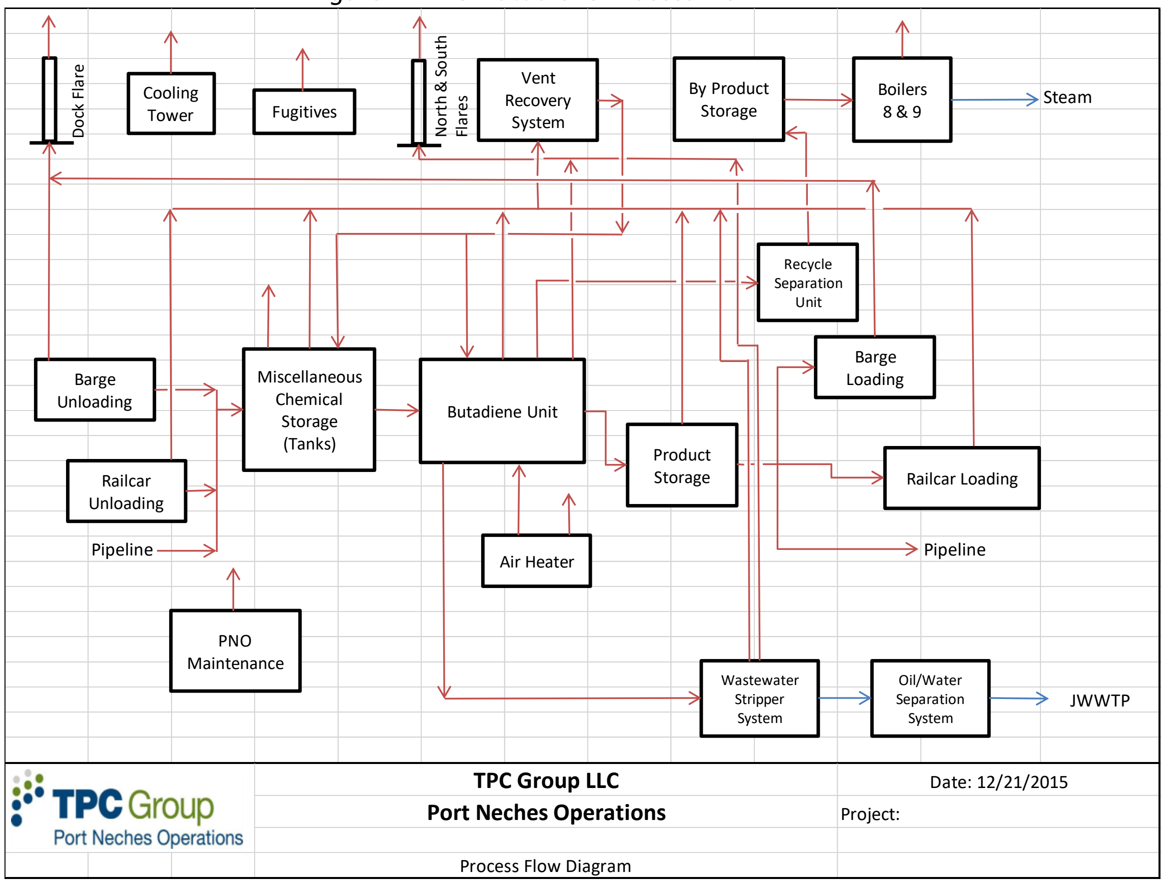
Construction of the PNO facility began in 1943 and initial operations began in February 1944 producing butadiene, the primary component of synthetic rubber. In 2006, the PNO facility was purchased by Texas Petrochemical, now TPC Group.

PNO employed more than 175 full-time employees and 50 contractors. Combined production capacity for this facility is more than 900 million pounds per year.

PNO's butadiene process produces butadiene by extraction and distillation of crude butadiene purchased from various olefin facilities to produce butadiene and raffinate. The facility has storage tanks, including some used to store MTBE and methanol for Indorama. The facility's infrastructure supports handling raw materials, intermediates, by-products and finished products via pipeline, barge and rail.

The Butadiene Unit receives raw or crude butadiene from barges, transport vessels, and pipeline. The crude butadiene is stored in several spherical pressure tanks along with intermediates, finished product, off spec product and solvent slop. From the raw material storage tanks, the raw material is first washed. The overhead stream is routed to treatment where impurities are removed. The reactor effluent is then routed to the Distillation section of the process. In the distillation section the effluent is distilled several times to remove heavy ends and further refine the product. After distillation the product is water washed for further purification. It is then stored in spherical pressure tanks until being shipped offsite mainly by pipeline and sometimes by transport vessels. Off spec product can be pumped back into the process as raw material or for partial processing.

Figure 2: PNO Butadiene Process Flow



3.c. Portion of the Facility Involved in Incident

The event occurred in Block 10 and impacted Block 5. Block 10 contained the Butadiene production process, including the columns and equipment for segregating, distilling, and compressing the final product, Butadiene and co-product, Raffinate. Please see the *Terminal Blocks Map*, below, to view the facility Blocks pre-incident and the PNO Plant Overview Map for post-incident impacts to Blocks 5 and 10.

The explosion and fire impacted the contents of several tanks and the South Group processing area. Chemicals that were involved in the release include 1, 3 Butadiene, MTBE, Crude C4, Raffinate and N-Methyl-2-pyrrolidone (NMP), which is a solvent utilized in the process.

An inventory taken the day before the event and inventory estimated following the main fire was used as the basis for impacted volumes. Table 1 in Appendix A summarizes the affected tanks, tank contents and the reduction in volume of barrels after the event. These values were used as one of the bases for the final emissions event report.

The following photo provides a view of the facility, with Blocks indicated, prior to the event.

Figure 3: South 4 Group Fire Terminal Blocks Map

Figure 4: South 4 Group Fire PNO Plant Overview Map, Post-Incident, Approximately 12/1102019

3.d. Chronology of the Event

Please refer to the attached *Chronology of the Event* in Appendix B of this report.

3.e. Description of the Event and Overview of Response

At approximately 01:00 on November 27, 2019, a loss of containment occurred from a transfer pipe between S4D4A and S4D4B in Block 10, causing a release of a vapor cloud that immediately ignited causing an explosion and subsequent fire in the South Group Processing Unit, especially Blocks 10 and 5.

Emergency response personnel from several organizations including Jefferson County and several members of the mutual aid organization, Sabine Neches Chiefs Association, responded to the fire. Jefferson County Office of Emergency Management, the EPA, TCEQ and PNO established a UC to address the incident through a coordinated response structure. More than twenty agencies and organizations participated in the response and monitoring efforts.

At approximately 13:45 on November 27, 2019, one of the process towers involved in the fire failed, resulting in a secondary explosion. Initial operations of facility personnel and emergency responders were to account for all employees and to address identified injuries.

An extensive network of real-time and analytical air monitoring stations was quickly established by UC.

- At the TPC's instruction, CTEH conducted monitoring around the facility and throughout the community. They monitored for total VOC, Butadiene, % LEL (Lower Explosion Level) and particulate matter utilizing portable analyzers that provided real-time results. CTEH established several stationary sampling stations around the facility and in the community. These collected 24-hour samples, which were sent daily to a certified laboratory for analysis to identify the quantity of several constituents that were measured, including total VOC's, PM and asbestos.

- EPA's Superfund Technical Assessment Response Team (START) conducted ground level air monitoring with hand held equipment in the vicinity of the incident site, and within the downwind community. The Airborne Spectral Photometric Environmental Collection Technology aircraft (ASPECT) conducted real-time airborne chemical and radiological detection, took infrared and photographic imagery of the incident and downwind community.

- The TCEQ deployed personnel and contractors to conduct handheld air monitoring within the communities downwind of the incident around the clock.

During the initial firefighting response, six pre-staged totes containing a total of 1320 gallons of per- and poly-fluoralkyl substance-containing foam were utilized to control the fire. Once the EOC was fully established, all use of foam ceased, and water was used to fight the fire. Most of the water associated with application of foam was directed to the JWWTP. Constituents of the foam were included as compounds of interest analyzed in CTEH's water sampling program. No samples exceeded the health-based screening values to which the results were compared. Please refer to Appendix G, for additional details.

The primary fire was extinguished on November 30, 2019 at 09:30, although several small fires were allowed to burn in order to consume the flammable gas leaking from indeterminable sources and extinguish themselves. All fires were declared extinguished on January 4, 2020. On December 4, 2019 at approximately 18:08, a voluntary evacuation/shelter-in-place was issued for the City of Port Neches in response to 1,3-butadiene detections related to the venting of 1,3-butadiene from a storage sphere within the facility. All action level exceedances were communicated to UC; these readings were evaluated by members of UC and the City of Port Neches and used to authorize a voluntary evacuation/shelter-in-place. The venting from the storage sphere was mitigated the next morning and the shelter-in-place order was lifted December 5, 2019 at 14:00.

As the firefighting response ended, the facility shifted to a monitoring and mitigation phase. Drones were flown several times per day when possible to provide aerial visuals and infrared scans of the facility, equipment and the canal. The flights helped identify continuing leaks, monitor the safe state of the equipment, assess damage and identify issues that needed to be addressed.

During the period from the initial addition of water to the fire, until a generator restored power at the joint wastewater facility, firefighting water and floating hydrocarbons collected in the ditches and containment at the facility until they became full and overflowed. The runoff primarily discharged through Outfall 201 to the Outfall Canal, which is the same canal into which the treated waste water from the JWWTP discharges. The first observed overflow at Outfall 201 was at 8:58 a.m. on November 27, 2019. Clean Harbors was the primary contractor to perform the water operations and served as the Oil Spill Removal Organization (OSRO). The OSRO installed a series of booms in stages down to the Neches River and utilized response equipment, including vacuum trucks, Jon boats and skimming devices, to collect and containerize hydrocarbon contaminated material.

Power was restored to the JWWTP on November 28, 2019 and portable pumps were commissioned at the PNO Site. At approximately 21:00 on the same day, PNO began sending waste water to the JWWTP. At times, firewater volumes and rates exceeded the capacity of the pumps and the JWWTP capacities, resulting in intermittent flows to the canal from Outfall 201 and subsequent containment by the OSRO.

A multifaceted SCAT Team was established, which included response and agency personnel. A SCAT was performed, and the canal was divided into five sectors to ensure monitoring and response actions prevented hydrocarbons from reaching the Neches River., approximately three miles away. During the response period, much of the water from the Outfall Canal was directed to flow through the tertiary treatment system to provide the greatest treatment and residence time prior to discharge to the Neches River.

Shoreline Sector	Shoreline, miles
Sector A	1.51
Sector B	1.21
Sector C	.96
Sector D	2.57
Sector E	2.34
Total	**8.59**

The overflow ceased on December 6th as a result of a reduction in the use of fresh firewater, an increase in the use of recirculated firewater and consistent pumping to the JWWTP. Response efforts continued until February 28, 2020, when TCEQ performed the final SCAT.

The facility then transitioned from firefighting to monitor and mitigation. PNO and contract personnel assessed the facility, identifying leaks and safety concerns, then systematically developed plans and protocols to mitigate leaks, restore necessary infrastructure and de-inventory the facility. Air monitoring continued at the facility and throughout the community. Monitoring and cleanup activities on the canal also continued. A plan was developed and implemented to remove blast debris that potentially contained asbestos in the community and within the facility.

3.f. Leaks

As the facility transitioned into monitoring and mitigation mode following the fire response, contract and facility personnel systematically surveyed the facility to identify leaks and develop protocols to mitigate them. A Source Control Report was developed to track the leaks and mitigation. *See Final Source Control Report* in Appendix C.

4.PNO Response Organization

4.a. Background

In order to marshal and organize all available resources at PNO into a rapid, orderly response team in emergency situations, PNO utilized an emergency operations organizational framework operated within the National Interagency Incident Management System (NIIMS) guidelines provided by the Department of Homeland Security, OSHA, Sabine Neches Chiefs, as well as by city, county and state agencies. PNO implemented its Emergency Action Plans in this event.

4.b. Unified Command

The UC Structure was utilized as a method of integrating federal, state, and local agencies with the responsible party. The purpose of this system is to organize the variety of agencies that may be involved in a response into a consistent team that performs their duties in a concerted, unified effort. The UC Structure consists of four key on-scene coordinators: Federal On-Scene Coordinator (FOSC), State On-Scene Coordinator (SOSC), Local On-Scene Coordinator (LOSC) and the PNO Emergency Operations Center (EOC) Manager. PNO's command structure also included the following positions as a part of UC: Public Information Officer (PIO), Liaison Officer, and Safety Officer(s). These entities shared decision-making authority and consulted with each other regarding response management issues. *See* Appendix D for *UC Organizational Structure*.

4.b.i.1. Federal On-Scene Coordinator

FOSCs are the federal officials predesignated by US EPA and the USCG to coordinate response resources, with US EPA always serving a primary FOSC in this response. The FOSC monitors, provides technical assistance, and/or directs federal and PRP resources. It is the FOSCs responsibility to provide access to resources and technical assistance that may not otherwise be available to a community. Under the National Contingency Plan (NCP), if federal involvement is necessary because state and local resources have been exceeded, the OSC is obligated to coordinate the use of these resources to protect public health and the environment. During an incident, EPA will usually provide FOSCs in the inland zone, and the USCG will generally provide FOSCs in the coastal zone. The FOSC coordinates all federal containment, removal, and disposal efforts and resources during an incident under the NCP or the Federal Response Plan (FRP).

4.b.i.2. State On-Scene Coordinator

The SOSCs are the state officials predesignated by TCEQ, Texas Railroad Commission (RRC) or Texas General Land Office (GLO) to coordinate state response resources. TCEQ is the primary state agency regarding incidents and was official SOSC for this response.

4.b.i.3. Local On-Scene Coordinator

The LOSCs are the local county officials predesignated by the local office of emergency management in conjunction with the local county judge. The county judge for Jefferson County Texas and the Jefferson County Office of Emergency Management representatives served as LOSC for this response.

4.c. Other Involvement

4.c.i. Primary Contractors

The primary contractors utilized by PNO during the response are as follows: CTEH, Clean Harbors Environmental Services, The Response Group (TRG), Global Risk Solutions, Cotton Logistics, US Fire Pumps, Williams Fire & Hazard Control, UPS Industrial Services, AAY Security, United Rentals, Environmental Analytical Services, Industrial Rescue, HydrochemPSC, National Compressor, Resolute Environmental, BakerRisk, BrandSafway, Harris DeVille, HazMat Specialist Services, GEM Mobile Treatment Services, Wildlife Response Services, Vallen, EcoWerks and Acadian Ambulance.

4.c.ii. Agencies

The following agencies and other organizations were involved in the response: EPA – Region 6, TCEQ, GLO, United States Coast Guard, Texas Parks and Wildlife, Jefferson County Sheriff's Office, US Department of Homeland Security, Jefferson County Office of Emergency Management, Orange County Office of emergency Management, Agency for Toxic Substances and Disease Registry, National Response Center, American Red Cross, Texas Forest Service, Texas Division of Emergency Management – Region 2, Chemical Safety Board, Occupational Health and Safety Administration, Lower Neches Valley Authority, Jasper County Sheriff's Department, Federal Bureau of Prisons, Hardin County Sheriff's Department, Texas Department of Public Safety, Jefferson County Drainage District, Port Neches Fire Department, Groves Fire Department, Nederland Fire Department, and Port Neches Police Department.

4.d. Work/Staging Areas

4.d.i. Emergency Operations Center

After the initial hours of the response the EOC was located at the Huntsman Administration Building on TX-136 Spur just south east of the TPC Port Neches facility. In the evening of November 27^{th,} the EOC was relocated to the Holiday Inn & Suites – Beaumont Plaza on Walden Road in Beaumont, TX. On December 4, 2019 the EOC was permanently moved to 3501 Turtle Creek Dr. in Port Arthur, TX. The EOC served as the work center for all individuals supporting the response that were not specifically assigned to the incident location. The Response Group (TRG) was mobilized to assist with organizing the EOC, providing tools and guidance to ensure an effective response was coordinated between the facility, EOC, the community and all agencies involved.

4.d.ii. Incident Command Trailer

The incident command trailer was near the facility and served as the headquarters for the response efforts for all individuals assigned to support the incident on location.

4.d.iii. Decontamination Areas

All decontamination activities associated with water operations response efforts were performed by a PNO contractor, EcoWerks. EcoWerks provided the industrial cleaning services at their facility which is located on Procter Street in Port Arthur, TX.

Decontamination activities associated with the on-site clean-up of ACM were performed by Clean Harbors and/or Cotton Logistics. Personnel decontamination stations were co-located near the work areas as each block within the facility was cleared of all ACM at grade. All other decontamination activities for on-site equipment and other materials were performed in Block 14 of the facility on the existing equipment wash pad. Two fully-contained "wet" decontamination stations were installed and one fully-contained "specialty" decontamination station was installed to perform these decontamination actions.

4.d.iv. Waste Staging Areas

All wastes generated by the incident response were staged and managed on-site or near the site. All liquid wastes were managed in 20,000-gallon frac tanks, most of which were located along Highway 366 near the water operations that were generating the waste. A lane of Highway 366 was blocked off to provide a safety buffer for the stored materials and the contractors handling the wastes. All solid/bulk wastes that were generated from the incident response were managed in various types of roll-off containers and the majority were staged at the PNO dock property located North of the facility along the Neches River. *See* Figure 5, *Waste Management Map* in Appendix A to view the staging locations of all response related waste.

5.PNO Actions Taken

5.a. Initial Operations and Emergency Response

Initial focus of facility personnel and emergency responders was to account for all employees and to address identified injuries. The incident commander focused on assessing and utilizing available resources and managing the incident until UC was established.

The Response Group (TRG) mobilized to assist with organizing the EOC, providing tools and guidance to ensure an effective response was coordinated between the facility, EOC, the community and all agencies involved. Daily shift meetings were established for continuous communications and resource requests throughout the length of UC.

Baker Risk was hired to assess all buildings on site and rank according to structural damage. Additionally, Baker Risk performed a hazard assessment on the damaged Blocks to determine remaining hazards and fall potential of equipment still standing, including developing a fall radius for the towers. An Exclusion Zone was established around Blocks 5 and 10 whereby entrance was prohibited without explicit authorization.

A Site Safety Plan was written and approved by UC providing personal protective equipment (PPE) expectations for facility entry and response, as well as for environmental cleanup in the community and along waterways. Radios were rented to ensure appropriate communication to all personnel and responders on site. Vallen Safety established a trailer at the facility with needed respiratory equipment, portable air monitors, Tyvek suits and any other necessary PPE to protect workers and emergency responders.

TPC worked closely with UC to ensure that the surrounding communities and other stakeholders were informed through multiple communication avenues throughout the event. A Joint Information Center (JIC) was established to post and distribute links to new releases, facts, FAQs and response imagery. A community response website was created, a community hotline was created for claims, and social media was utilized to distribute information related to the event. A total of 46 News Releases were issued by TPC during the period of the UC. EPA issued 35 News Releases on their South 4 Group Fire website between November 27th and December 13, 2019.

5.b. Firefighting Response

All firefighting efforts were led by the TPC Fire Suppression Group Supervisor. Multiple municipal fire departments immediately responded to the incident site, as well as, several industrial neighbors as members of the mutual aid organization for the South East Texas area, Sabine Neches Chiefs' Association.

During the initial firefighting response, six pre-staged totes containing a total of 1320 gallons of per- and poly-fluoralkyl substance-containing foam were utilized to control the fire. Once the EOC was fully established, all use of foam ceased, and water was used to fight the fire. Most of the water associated with application of foam was directed to the JWWTP. Constituents of the foam were included as compounds of interest analyzed in CTEH's water sampling program. No samples exceeded the health-based screening values to which the results were compared. Please refer to Appendix G, for additional details.

Firefighting efforts for cooling were established after the initial explosion with unmanned fire monitors on the north and northeast side of Blocks 5 and 10. The area's mutual aid organization, Sabine Neches Chief's Association, responded and began establishing staging at the Huntsman (now Indorama) contractor parking area whereby emergency response resources from industrial neighbors were staged. Effective cooling of the Blocks was established around 8:00 am and plans were put in place to receive water supply from the nearby Neches River to effectively utilize additional unmanned fire monitors. Once all water resources were obtained, approximately 36,000 gpm of firewater were used to continue cooling and to start addressing target fires. US Fire Pumps and Williams Fire Control were on hand to assist with establishing this flow.

TPC and supporting firefighting resources used the Port Neches Fire Department's tower for an aerial view of the facility to adjust firewater monitor streams as needed. This firefighting strategy was utilized throughout the 7-day period after the initial explosion until all spot fires were extinguished and only intentional vapor-pressure fires remained.

5.c. Monitoring and Containment

5.c.i. Air Monitoring/Sampling

TPC engaged the CTEH to perform ambient air monitoring and sampling shortly after the incident occurred to determine potential community exposure, including temporary fence line monitors. Real-time air monitoring and analytical air sampling operations began at approximately 09:42 the morning of the incident. Handheld real-time air monitoring and analytical air sampling performed around the facility and within the surrounding community between 11/27/19 to 1/30/2020 totaled over 161,619 readings with over 59,811 readings taken for 1,3 butadiene. The final CTEH Community Air Monitoring and Sampling Report, located in Appendix F, contains the summary of the community monitoring plan, UC approved action levels, test methods, results and copies of the sampling plans. The *Real-Time Air Monitoring Trend Graph* in Appendix F graphically shows the period of community readings for 1,3 butadiene. Of the over 59,810 only 666 detections of butadiene were recorded. *See Table 4.1.1 Community Handheld Real-Time Air Monitoring Results* in Appendix F for a summary of the analytes, instruments used, number of readings and number of detections, and range of detections of all real-time community handheld monitoring performed by CTEH.

The *Air Monitoring Sites Overview Map* in Appendix F depicts the locations of the fixed location ambient air sampling stations that were deployed the morning of the incident. Most of the analytical stations were located within the 4-mile radius of the initial evacuation zone. 893 twenty-four-hour period samples were collected and analyzed for total VOCs. Table 4.2.1 *Summary of Outdoor Analytical Air Sample Detections – VOCs* depicts the details of the analyte sampled, the number of detections, the detection range in parts per billion (ppB) and the TCEQ health-based screening values.

CTEH followed the UC-approved air monitoring and sampling plan to conduct both real-time air monitoring and analytical air sampling to assess the potential for airborne chemical exposures within the nearby communities surrounding the TPC Port Neches facility. The UC approved site-specific action levels in the Air Sampling and Analysis Plan required notification to the FOSC if sustained 1,3-butadiene detections of 0.5 parts per million (ppm) or greater, and VOC detections of 5.0 ppm or greater were detected in the areas surrounding the TPC facility. Sustained detections of 1,3-butadiene or VOCs above their respective action levels resulted in the deployment of a response team consisting of members of UC (including federal and state representatives) to conduct air monitoring and evaluation in conjunction with CTEH personnel. The air monitoring data collected would be used to direct decisions by UC. The CTEH final air monitoring and sampling data indicate that there was no adverse impact on public health in the community from November 27, 2019 starting at 09:42 hrs. to January 30, 2020 as a result of the South 4 Group Fire event. *See* Appendix F for further details.

The emissions released to the air during the entire event are summarized in the table below. These emissions represent the combusted VOCs and the byproducts of combustion from the main fire and the subsequent pressure related fires that burned until January 4, 2020. All fire related emissions were reported as the South Plant Fire and were reported as required to TCEQ via the State of Texas Environmental Electronic Reporting System (STEERS) reporting website. Of the 284.11 tons of VOC emitted from the fires, 127.58 tons of 1,3 butadiene was emitted to the atmosphere. The fugitive emissions reported for the various Blocks within the facility were a result of various leaks that were discovered post event. Of the 6.47 tons of VOC emitted from leaks, 1.24 tons of 1,3 butadiene was emitted to the atmosphere.

Figure 6: Event Emissions to Air

Total Emissions Summary			
Source	**Pollutant**	**Emissions**	**Unit**
South Plant Fire	NOx	8.15	ton
	CO	103.63	ton
	PM (unspeciated)	113.25	ton
	PM2.5	84.94	ton
	SO2	6.58	ton
	VOC	284.11	ton
Block 4 Fugitives	VOC	0.01	ton
Block 5 Fugitives		2.61	
Block 7 Fugitives		0.09	
Block 8 Fugitives		0.13	
Block 9 Fugitives		0.67	
Block 10 Fugitives		0.53	
Block 11 Fugitives		0.16	
Block 12 Fugitives		0.12	
Block 13 Fugitives		0.11	
Block 18 Fugitives		2.03	
Block 19 Fugitives		0.03	

5.c.ii. Discharge Containment and Water Sampling

5.c.ii.1. Discharge Containment

Extensive water operations were initiated the morning of the incident. Fire water runoff was produced by the firefighting activities on-site. The power outage caused by the event impacted the JWWTP, so the Site was initially unable to send the water to the treatment plant. A flow of floating hydrocarbon and firefighting water runoff at Outfall 201 was first observed at 08:58 on November 27, 2019.

TPC worked with Indorama to install a generator, repair damaged equipment and install pumps to transfer wastewater to the JWWTP by 20:58 on November 28, 2019. In the interim, every effort was made to contain as much of the firefighting water runoff as possible in the drainage systems and ponds within the facility. Additional water retention capacity was also utilized at Lion Elastomers' site.

When the ditches and containment at the facility became full, the runoff discharged primarily through Outfall 201 to the Outfall Canal, which is the same canal into which the treated waste water from the JWWTP discharges. Water in this canal ultimately discharges into the Neches River, approximately three miles downstream.

Alternately, the water can be directed by Indorama to their tertiary treatment section, which also discharges into the Neches River. During the response period, the canal was divided into five sections, A through E, in order to efficiently manage response efforts. *See Surface Water Sampling Flow Paths* on Page 53 of Appendix G for the boundaries for divisions. A series of booms and response equipment including vacuum trucks, Jon boats and skimming devices were used to collect and containerize contaminated material prior to reaching the Neches River. The *Boom Overview Map*, Figure 7 in Appendix A, depicts the locations that the OSRO contractor placed a variety of booms and other mitigation measures.

Water in the canal in flows through Divisions A, B and C, then to the Star Lake Canal (Division D) to the Neches River. Division E was included because during the response period, much of the water from the Outfall Canal was directed to flow through the tertiary treatment system to provide the greatest treatment and residence time prior to discharge to the Neches River.

Once wastewater flow to the treatment plant was established, TPC installed pumps in the internal ditches to redirect runoff to the PNO ponds for reuse as firewater or sent to the JWWTP. At times, firewater volumes and rates exceeded the capacity of the pumps and the JWWTP capacities, resulting in intermittent flows to the canal from Outfall 201. The overflow ceased on December 6, 2019 as a result of a reduction in the use of fresh firewater, an increase in the use of recirculated firewater and consistent pumping to the JWWTP.

The following Table represents the resources utilized to mitigate potential impacts to the canal.

Outfall Response Resources Personnel	**Boom (ft.)**	**Sorbent Boom (ft.)**		**Response Boats**	**Skimmer**	**Vacuum Trucks**	**Frac Tanks**	**Viscous Sweep**
60+	5,100	56,500		6	1	6 (Normally 3)	21	250

A multifaceted SCAT Team was established, which included response and agency personnel. A plan was developed, identifying the agreed-upon endpoints for the final signoff inspection. They are as follows:

1. No released material on vegetation or pilings that can rub off on contact and affect sensitive areas, wildlife, or human health.
2. No free-floating released material unless removal will adversely affect the habitat and/or pose a risk to human health.
3. Remaining released material does not produce a sheen which will affect sensitive areas and wildlife. (i.e. minor sheening not deemed to threaten sensitive areas or wildlife would meet the endpoint.)
4. No readily accessible and/or mobile oiled debris; unoiled debris should not be removed.
5. Less aggressive endpoints will be evaluated on a site-specific basis.

The initial SCAT was performed on December 2, 2019. As discussed above, the canal was divided into five sectors to ensure monitoring and response actions prevented hydrocarbons from reaching the Neches River, approximately three miles away. The shoreline associated with each section is in the following table. The assessment revealed hydrocarbons had not reached the Neches River. *See* Appendix H for a report and figure showing the extent of hydrocarbons found on the shores of the Outfall Canal.

Shoreline Sector	Shoreline, miles
Sector A	1.51
Sector B	1.21
Sector C	.96
Sector D	2.57
Sector E	2.34
Total	**8.59**

Response efforts continued until February 28, 2020, when TCEQ performed the final SCAT. *See* ICS 209 Form Outfall in Appendix D for summaries of resources utilized with water operations.

5.c.ii.2. Water Sampling

Surface water sampling activities by CTEH began at 23:00 on November 27, 2019. Sampling was primarily focused on areas in proximity of outfall locations to evaluate downstream movements of runoff from the facility and to assess the potential for offsite chemical impacts. The final CTEH report, *Surface and Drinking Water Environmental Sampling Report* in Appendix G provides locations of the sampling points, a summary of analytical results and comparisons to health-based standards.

From the period of November 27, 2019 through January 31, 2020, CTEH collected 261 surface water samples from 20 locations and eleven drinking water samples from one location. Initial surface water sampling was conducted twice daily from November 28, 2019, through December 11, 2019. Based on the review of sampling results which indicated no impacts to the surface or drinking waters and no ongoing releases of water from the site, UC approved the Environmental Sampling Reduction Plan on December 11, 2019. Asbestos analysis was discontinued, and surface water sampling was reduced to daily sampling from December 12, 2019, through December 19, 2019. On December 20, 2019, TCEQ verbally approved adjusting sampling efforts to weekly sampling events, which were performed until January 31, 2020. Water samples were taken from locations upstream of the incident discharge facility at the Huntsman dock, Collier's Ferry Park in Beaumont, Texas, and the PNO facility water intake location on the Neches river, as potential baseline sampling locations to aid in the evaluation of facility-specific sampling data. Surface water samples were collected from permitted outfalls for the PNO facility and neighboring facilities, water retention facilities and effluents, all canals associated with the JWWTP runoff, the raw water intake for the city of Port Neches (WS007), and the final permitted discharge location. Drinking water samples were collected from a faucet inside the City of Port Neches Water Facility from December 17, 2019, through January 19, 2020.

CTEH followed UC-approved sampling plans to collect surface and drinking water samples to assess the potential for offsite chemical impacts and guide onsite remedial operations. Results from surface waters were compared to various health-based screening values, depending on the reported water use and community access (i.e. recreational, fishing, swimming, etc.). Similarly, drinking water samples were compared to TCEQ residential groundwater Protective Concentration Levels (PCL) and USEPA MCLs. Analytical sampling results indicated there were no exceedances of TCEQ Contact Recreation PCLs.

Whereas some Risk-Based Exposure Limit (RBEL) exceedances were reported for PAHs in select sampling locations, it should be noted that most of these detections above RBELs were well within range of site-specific baseline samples collected at locations upstream of the site. Importantly, PAHs are naturally occurring, and frequently documented to be present in surface waters of the United States at levels hundreds of times (up to 0.6 µg/L) above those levels documented here. Although there are no applicable PCL or RBEL screening values for asbestos in surface water, it is notable that all but two of the 44 samples showed that asbestos fibers were either not detected or detected below drinking water regulations. The two detections of asbestos fibers above the drinking water regulation are not of toxicological significance, given that the sample locations are not categorized as a drinking water source and thus would not be used as potable water. Further, whereas 1,3-butadiene and related compounds were initially detected at low parts per billion levels in surface water samples collected downstream of the TPC facility, the concentrations of all detected compounds decreased rapidly to levels comparable to baseline and/or below detection limits.

All drinking water samples collected reported no exceedances of the available TCEQ drinking water PCLs or USEPA primary MCLs, and there were no detections of 1,3-butadiene in any of the collected drinking water samples. At the recommendation and approval of UC, CTEH completed surface water and drinking water sampling on January 31, 2020.

5.c.iii. Soil Sampling

No soil sampling was performed during the UC period of the event, November 27, 2019 to January 30, 2020. Impacts to soil will be addressed during the demolition phases of Blocks 5 and 10 at the facility.

5.c.iv. Asbestos Sampling and Removal

The fixed location ambient air sampling stations deployed at 09:42 on November 27, 2019 by CTEH also analyzed for asbestos to quantify the presence of airborne asbestos fibers, if any, in the nearby community. *See Table 4.2.4 Summary of Analytical Sampling – Integrated Asbestos Air Sampling*, located in Appendix F, which details the method of analysis, number of samples and number of detections of total fibers and asbestos fibers.

Beginning on December 1, 2019, TPC instructed CTEH to perform observational assessment and collection of potential facility-related debris in the community near the PNO facility. The assessments were conducted at various locations including residential, commercial, industrial and public areas within the community surrounding the TPC facility. Cotton Logistics brought in a team of approximately 450 persons to pick up debris and PACM in the community and in the facility. All debris collected was handled as ACM. If a property assessment revealed industrial related debris, CTEH would perform bulk and wipe sampling for ACM, as appropriate.

If PACM was found, it was removed and disposed of as ACM at the TPC waste staging area. Cotton also set up decontamination stations within the facility for decontaminating equipment and needed or agency requested documentation pulled from the facility buildings. Decontamination trailers were also rented and setup at the facility for emergency responders to minimize exposure to PACM.

5.c.v. Waste Management

Wastes generated from the response was collect, placed in containers and stored for ultimate disposition. The following table provides information on the types of wastes, the quantities collected and the facilities to which they were sent.

Waste Description	Amount Generated	Amount Sent Off Site	Unit of Measure	Disposal/ Treatment	Notes
Waste Water from Canal Response, including washout water	259,622	259,622	Gallons	Intergulf Corporation	Approximately .1% hydrocarbon.

Waste Description	Amount Generated	Amount Sent Off Site	Unit of Measure	Disposal/ Treatment	Notes
Hydrocarbon Contaminated Debris (Response debris)	27.49	27.49	Tons	WM Newton County Landfill	
Asbestos Containing Material (PACM Cleanup)	49.64	49.64	Tons	WM Newton County Landfill	Information included on the 209 for Air Release
Class 2 Wastewater from KO Pot Clean out	7,680	7,680	Lbs	Clean Harbors Deer Park	Not released
Soil From Hydro Excavation	30	0	Yards	Will send to WM Newton County. This is an estimated amount.	
Hydrocarbon from South Separator & API	154.43	154.43	Tons	Sent to Waste Management Lake Charles	This did not leave site, it collected in the wastewater sump system.
Water with Hydrocarbon from Dewatering Tanks & Washes	2,000	0	Bbls.	Being Tested to determine Waste code, may generate more. The hydrocarbon will be separated from the water and water sent to the JWWTP.	Not Released
Mixture of Hydrocarbon from process with water	200	0	Bbls.	Still moving within tanks and de-watering. This is being scheduled to go to Clean Harbors for incineration	Not Released
Water and Hydrocarbon from Sump	46.8	46.8	tons	Some was sent to Intergulf, remainder sent to Clean Harbors	This did not leave site, it collected in the wastewater sump system.
Activated Carbon	2,000 spent 6,000 in use	0	Pounds	Testing to be done to verify Class 1; continue to generate	
Bioscrub, scrubbing solution for frac tank control	125 spent 750 in use	0	Gallons	Still in use, will sample to determine waste code and disposition.	

5.d. Community

Ambient air monitoring began within hours of the start of the event, extensive monitoring resources were deployed. Monitoring response teams were positioned throughout the initial 4-mile radius of the facility and 24/7 monitoring continued throughout the UC period of the event and beyond. Extensive water monitoring resources and response cleanup resources were quickly deployed, and those resources were in place throughout the same periods as the air monitoring. A community hotline and community response website were established the day of the incident to support and inform our community. As soon as the main fires were extinguished TPC began efforts to assess the industrial debris in the area and deployed multiple contractors to document, sample, remove and dispose of incident related debris. Over 2,800 properties were assessed. TPC worked closely with the Mayors, Fire Chiefs and Police Chiefs of the surrounding communities of Port Neches, Groves and Nederland.

5.e. Wildlife Response

PNO utilized Wildlife Response Services as the contractor to manage wildlife impacts associated with the incident and, working under the Operations Section Chief, assist in subsequent response efforts. Texas Parks and Wildlife representatives were also active participants in the EOC. As part of the daily review, the OSRO contractors and SCAT Team members reported on any wildlife observed. *See* Appendix E for Form 209.

Overall summary of carcasses observed impacted – not collected:
· 2,000 shad (1'' – 3'') (approximately) – observed by TCEQ
· 30 bass, catfish, and red drum (approximately) – observed by TCEQ
· 24 blue crabs – observed by TCEQ
· 1 alligator – observed by operations. This was determined to have died prior to the event
· 2 blue teal ducks – observed by TCEQ and determined to not be associated with the event

Overall Summary of Wildlife Collected at Incident Site:
· 28 White Bass (collected by TPWD)
· 7 Yellow Bass (collected by TPWD)
· 3 Bluegill (collected by TPWD)
· 1 Spotted Sunfish (collected by TPWD)
· 2 Red Ear Sunfish (collected by TPWD)
· 1 Alligator Gar (collected by TPWD)
· 1 Blue Catfish (collected by TPWD)
· 8 Striped Mullet (collected by TPWD)
· 3 Green Sunfish (collected by TPWD)

Appendix A – Figures and Tables

Figure 1: Incident Overview Map

Figure 5: South Group Waste Management Map

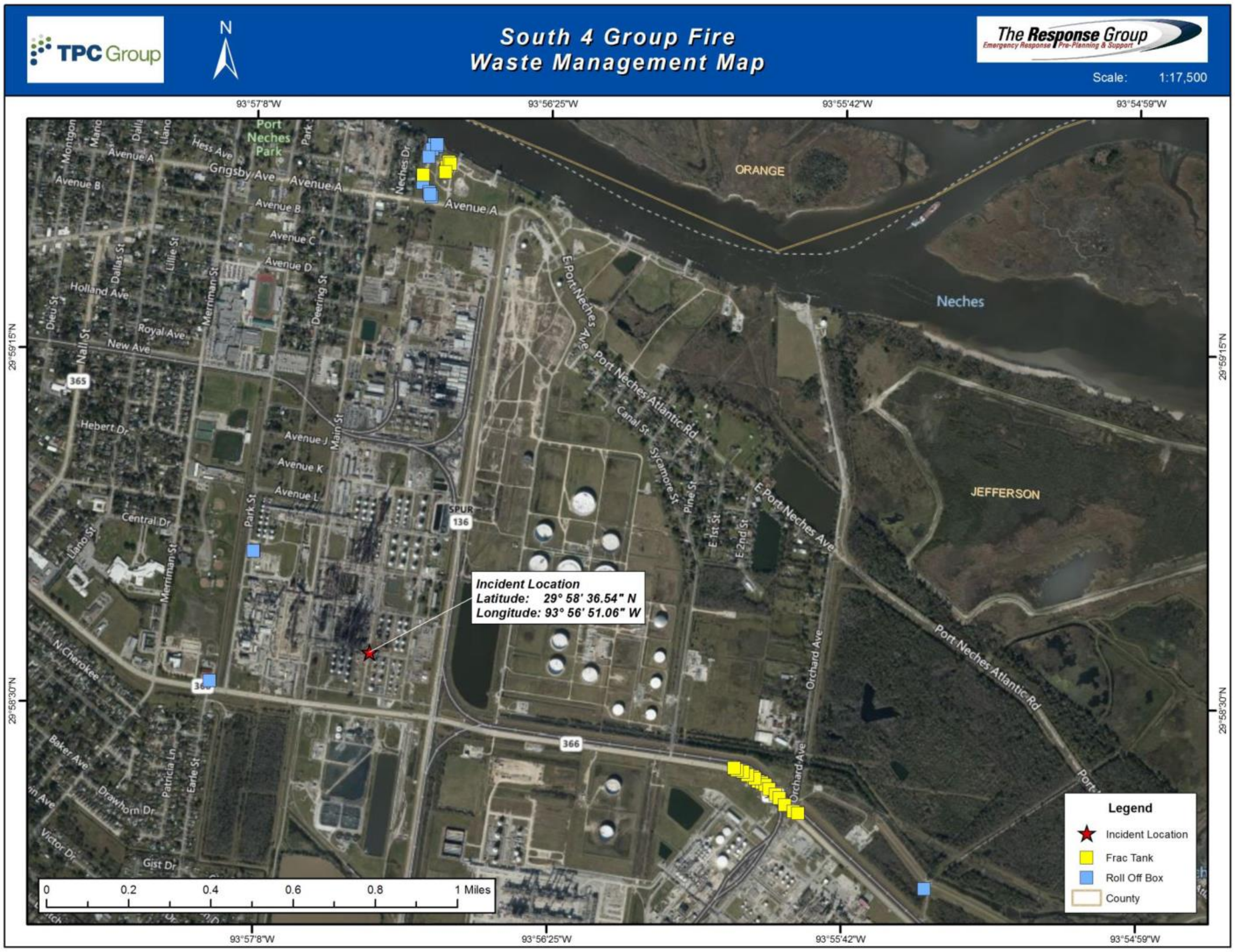


Table 1, Summary of Tank Losses

Material	Tank Number	Reduction in BBLs
Block 9		
Regular Crude C4	25	1,791
Regular Crude C4	26	293
Raff Intermediate	27	2,346
Regular Crude C4	28	2,752
Regular Crude C4	29	2,756
NMP	30	1,065
Segregated Crude C4	31	773
Regular Crude C4	32	590
Regular Crude C4	87	2,723
Raff-1 BB	92	39
Block 4		
NMP	48	55
Methanol	55	344
Methanol	56	71
High Butane Raff	33	106
High Butane Raff	34	40
High Butane Raff	35	4,966
High Butane Raff	36	4,757
Polyblend	37	152
Polyblend	38	165
Raff	41	1,635
Raff	42	1,588
Raff	99	240
Polyblend	98	367
Raff	88	143
Finish Crude Feed	90	5,117
Finish Crude Feed	91	458
Finish Crude Feed	96	2,831
Raff	97	123
Block 7		
Regular Crude C4	103	2,137
Raff-1 BB	1	322
Raff-1 BB	2	506
Regular Crude C4	3	1,151
Regular Crude C4	4	672
Regular Crude C4	84	1,579
Butadiene - High TBC	85	355
Regular Crude C4	5	1,361
Regular Crude C4	6	1,401

Material	Tank Number	Reduction in BBLs
Block 13		
Segregated Crude C4/water	17	183
Segregated Crude C4	21	223
Segregated Crude C4	23	233
Segregated Crude C4	24	243
Block 8		
Butadiene - High TBC	100	1,383
Butadiene - High TBC	104	736
Butadiene - Low TBC	15	731

Figure 7: South 4 Group Fire Boom Overview Map (12/12/2019)

A series of booms and absorbents were placed in series along the canal to prevent the release of hydrocarbons to the Neches River. The OSRO contractor utilized hard booms, soft booms, viscous sweep, skimmer equipment, oil absorbent mops jon boats and vacuum trucks to collect the floating hydrocarbons. This figure shows the placement of the booms. The vacuum trucks, usually three in service, were stationed at Pine and Orchard Streets.

Appendix B - Chronology of the Event

Date/Time	Event/Notes
11/27/2019 1:00	Explosion occurred at TPC Port Neches Facility
11/27/2019 __:__	Emergency Response Plan was immediately activated. Firefighting activities initiated and request for mutual aid.
11/27/2019 3:24	SERC notified (SERC Report No. 20194276) (Anthony Hilts with TCEQ was notified by SERC)
11/27/2019 3:40	NRC notified (NRC Report No. 1264990)
11/27/2019	Unified Command established
11/27/2019 8:58	Run-off of firefighting water is overflowing Outfall 201 weir. Power outage to the site and surrounding areas occurred at the time of the event. This impacted the jointly owned waste water treatment plant, operated by Indorama. TPC attempted to retain the water, but capacity exceeded and water began flowing from Outfall 201.
11/27/2019 9:21	Confirmation of boom for water run-off. Clean Harbors at Motiva Gate installing booms in stages down to the Neches River.
11/27/2019 09:42	CTEH begins real-time air monitoring
11/27/2019 __23:00__	CTEH arrived on site 08:00, developed the Environmental Analysis and Sampling Plan, which was approved by UC initiates surface water and firefighting water sampling at 23:00
11/27/2019 13:45	Secondary explosion occurs. All personnel accounted for, no injuries.
11/27/2019 15:35	Evacuation Order for 4-mile radius of the facility issued
11/27/2019 17:14	Packing and moving the EOC from Indorama (Hunstman) Admin Bldg. Ultimately, the decision was made to relocate to the Holiday Inn at Walden Rd
11/27/2019 17:51	EOC is operational at Holiday Inn at Walden Rd in Beaumont
11/27/2019 18:03	Overflowing Outfall 201 weir
11/28/2019 10:30	Drone/IR/Thermal video feed of the incident scene into EOC initiated
11/28/2019 20:58	Flow re-established to JWWTP. Repairs were made and generator used to establish power, diesel pumps were set up and connected to the pipeline to allow flow to be re-established.
11/29/2019 10:28	Evacuation Order for 4-mile radius of the facility is lifted.
11/30/2019 2:03	All fires in Block 5 tank farm are extinguished.
11/30/2019 9:31	Main fire in Block 10 (South Unit) extinguished. Only very small pressure fires remain.
11/30/2019 23:27	Leaning tower S4D3 fell. No injuries.
12/1/2019 __:__	Wildlife Rehabilitation contractor contacted
12/1/2019 __:__	Texas Parks & Wildlife notified
12/2/2019 0:00	Sphere and Equipment temperature monitoring rounds initiated. A drone was used to survey and monitor the equipment near and surrounding the impacted zone.
12/2/2019 9:00	Community Asbestos Assessment by CTEH commences
12/2/2019 __:__	Initial Shoreline Cleanup and Assessment Technique (SCAT) was performed. A multi-agency team evaluated the outfall canal shoreline and the wetland areas between the outfall and Neches River. Based on the survey, sectors were established for cleanup and monitoring activities.
12/2/2019 16:00	Wildlife Hotline established
12/4/2019 18:08	Shelter-in-Place issued by County Judge due to TK25 leak
12/4/2019 22:00	Voluntary evacuation/shelter in place order issued

12/5/2019 9:43	TK25 damaged relief valve was switched to standby relief valve. Leak secured.
12/5/2019 12:30	Voluntary evacuation/Shelter-in-Place lifted
12/6/2019 __:__	Overflow of Outfall 201 weir ends
12/11/2019 __:__	Unified Command approved a reduction in water sampling locations
12/11/2019 __:__	Unified Command approved the reduction in community real-time air monitoring from 4-mile radius to 1-mile radius of the facility
12/11/2019 __:__	Follow-up SCAT performed
12/16/2019 11:14	Overflow of Outfall 201 occurs due to failure of portable pump
12/16/2019 12:19	Overflow of Outfall 201 ceases, portable pump restarted
12/19/2019 __:__	Unified Command approved a second reduction in water sampling frequency
12/19/2019 __:__	Unified Command approved a second reduction in community real-time monitoring from 1-mile radius to 0.5-mile radius of the facility
1/4/2020 __:__	All remaining small fires are extinguished
1/26/2020 __:__	Follow-up SCAT performed
1/26/2020 __:__	Initiated surface water and soil sampling post-event activities
1/30/2020 __:__	Unified Command approved the completion of surface water sampling activities for event
1/30/2020 __:__	Unified Command approved the reduction in community real-time air monitoring to just the fenceline perimeter around the facility
1/30/2020 __:__	Unified Command disbanded and incident command relinquished to TPC
2/11/2020 __:__	Community Asbestos Assessment activities conclude
2/26/2020 __:__	Post-event surface water and soil sampling activities completed
2/26/2020 __:__	Final SCAT performed by TCEQ
2/28/2020 __:__	Discharge waterway cleanup activities conclude and booms and supporting equipment demobilized
3/30/2020 11:12	Emissions Event ends

Appendix C – Final Source Control Report

Source Control Daily Report

TPC Port Neches Incident

.Source Control Tracker Table

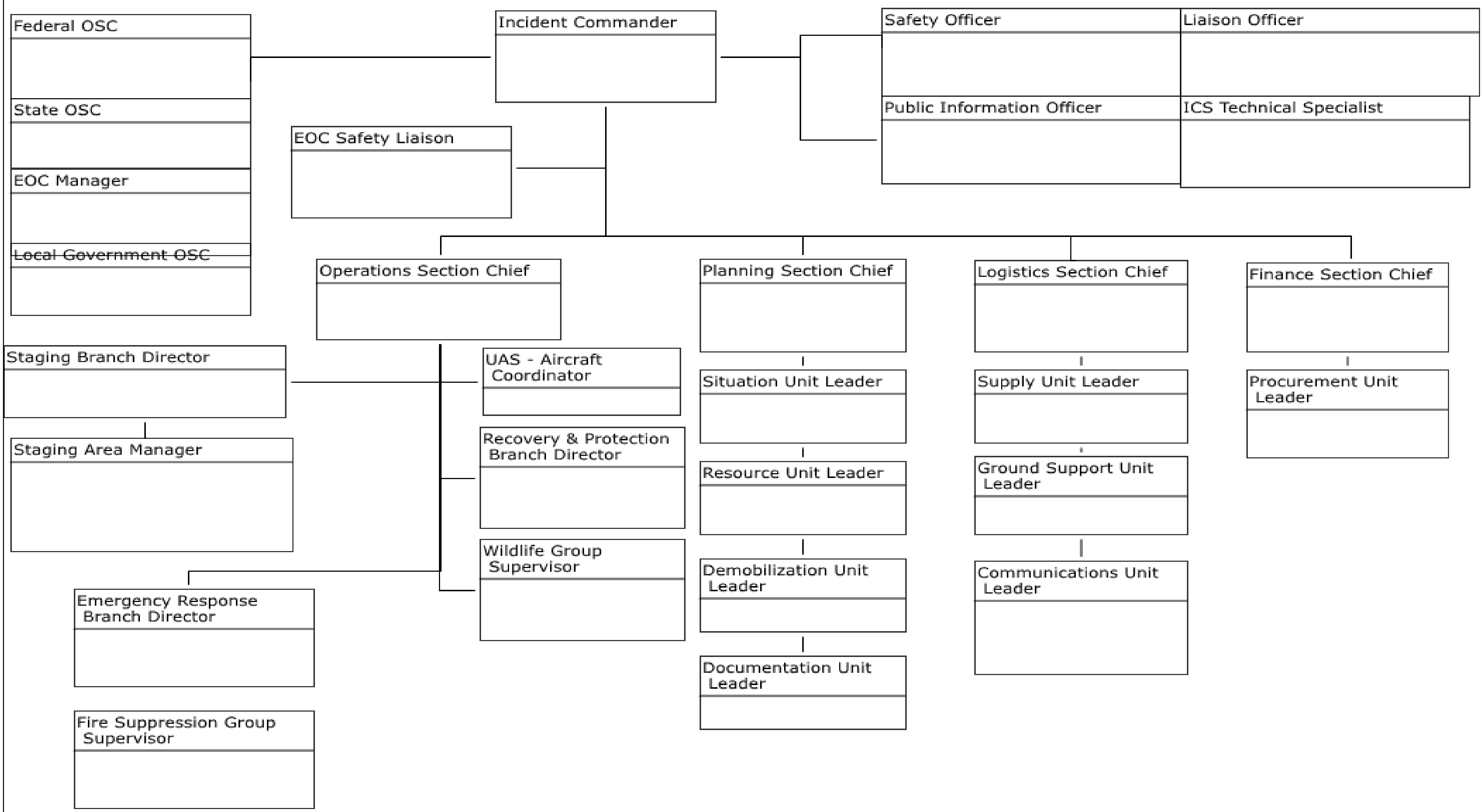
Identifier	Status	Source Description	Origin	Mitigation Complete On	Last Activity Comments	Last Activity Date
10-17TK-01	COMPLETE	Tk-17 3" Header @ 3-1 Gantry under Fallen tower (S2D8) in Block 10. #15 Tim Harris' List	1/13/2020	1/15/2020	Leak checked after water purge. 0ppm VOC, 0ppm 1,3 BD, 0% LEL.	1/17/2020 9:35 AM
10-19Effluent-01	COMPLETE	Vapor visible to naked eye coming from ~600 lbs flange on 8" line. Located on the West side of Block 10 south of the reactors and directly east of a horizontal bullet tank.	1/12/2020	1/16/2020	Tim Harris, Richard Breaux, SRS, and CTEH went in to evaluate leak, trace lines, and potentially shut in line to mitigate the leak. 3 valves were closed at the reactors. Vapors were drastically reduced. Water monitor turned back on.	1/14/2020 9:20 AM
19-26F4-01	COMPLETE	West flange and East packing on east end of block. Formerly "Flare Line"	1/26/2020	2/3/2020	CTEH personnel noticed strong odor again in area of 5th st and C ave. Investigation findings of true origin of leak in SE pump sump in block 19. Pump was running and moving water into sump at 5th and C. Williams fire applied foam blanket	1/28/2020 4:00 AM
04-328H2Line-01	COMPLETE	Plug coming off of 90 and valve on 90. 49% LEL. Hydrogen has a cross sensitivity to the MultiRAE Pro carbon monoxide sensor. CO sensor detected 40ppm.	1/28/2020	1/28/2020	Chip Day (SRS) tightened the valve packing and TPC pipe-fitter tightened plug until no LEL or hydrogen registry on the carbon monoxide sensor was observed. Water was poured over each source with no observed bubbling.	1/28/2020 12:19 PM
10-Block10FlareHeader-01	COMPLETE	Corner of 2nd and B. Flare header in process unit near gantry-1	1/24/2020	2/22/2020	4 Blinds installed near 3rd and B. 2-14" blinds at S3F29, 2-8" blind at S3F29	1/26/2020 11:40 AM
10-ED-01-01	COMPLETE	ED-1 Overheads to Raff Splitter @ 3-1. 4" line on 3rd street cross lateral @ 3-1 Gantry pipe rack under fallen tower (S2D8) in Block 10.	1/8/2020	1/8/2020	1. S2D4OH & S4D5OH blocked in at tie in to 92TK Line in MRU unit (see photo log) 2. Block S2D4OH & S4D5OH at Manifold 3-1 Gantry (see photo log)	1/8/2020 8:00 AM
05-NaturalGasLine-01	COMPLETE	Natural gas line between tank 41 and tank 89. S of platform by 3rd St.	1/12/2020	1/12/2020	Plug installed in gas line. Leak mitigation completed	1/12/2020 10:00 PM
05-OldBDLine-01	COMPLETE	Old BD Line beneath N side of tower in Block 5. #14 Tim Harris' List	1/16/2020	1/16/2020	Leak initially detected on Area RAEs near Tank 38 in excess of 300ppm VOCs, then extending to detections on additional AreaRAEs in the surrounding area NW of Block 5. TPC Safety detected plume in an area near Tank 35 with a FLIR camera. TPC, CTEH, and SRS approached an upwind entry into Block 5 from 2nd St. While traversing the East edge of the exclusion zone from berm, a	1/16/2020 3:21 PM

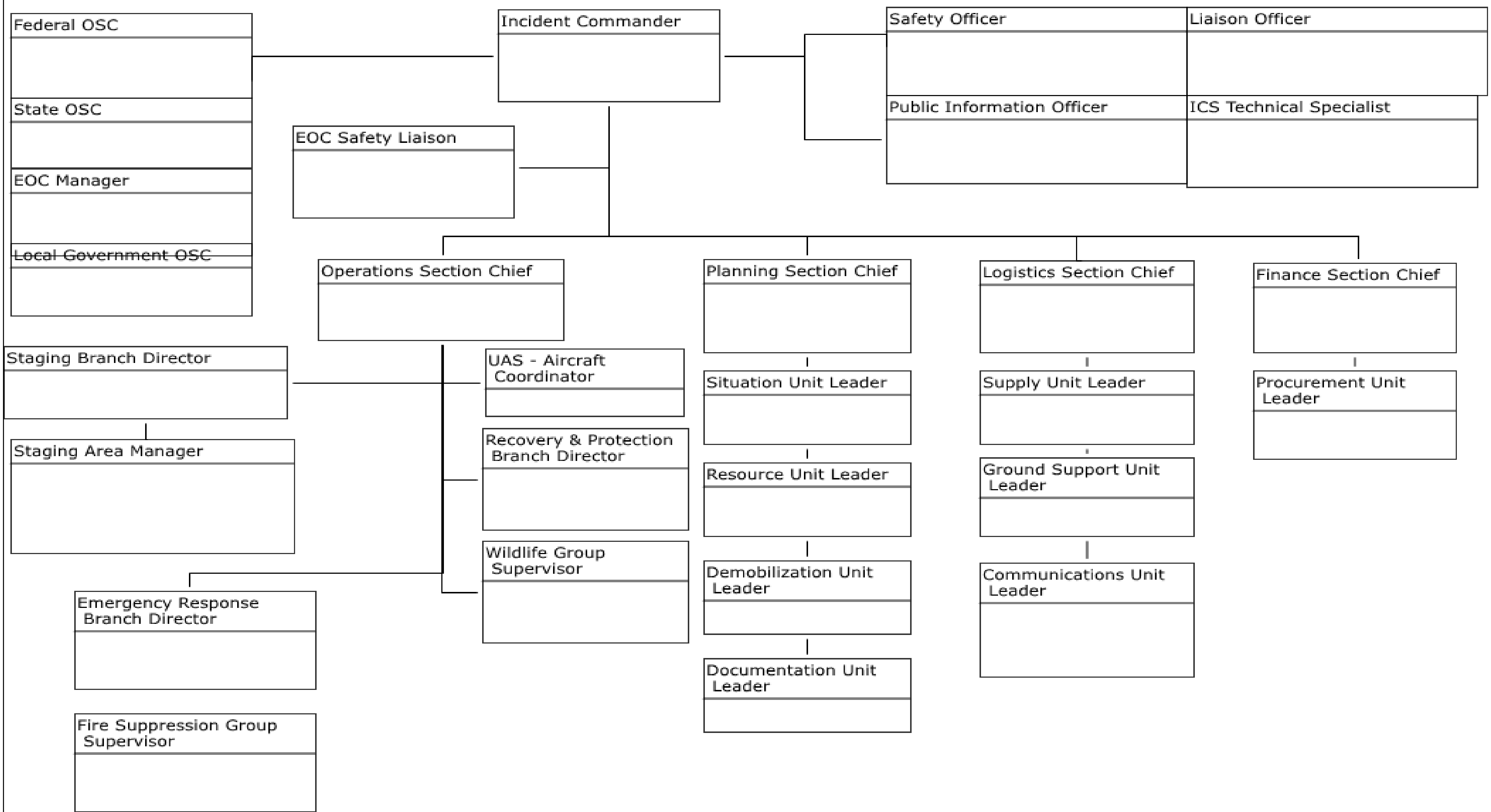
					bubbling sound was noted, then bubbling was visible in the water North of the fallen tower. Readings at the bubble's source were above the upper detection limits for VOCs and %LEL. TPC and CTEH tracked the "Old BD Line" due North to locate the closest valve. The valve located at the pipe chase directly South of 3rd St. was closed and the bubbling eventually stopped and plume diminished.	
12-SpongeOilSump-01	COMPLETE	Sponge oil from tower in SE corner of Block 12 drained to sump.	2/4/2020	2/6/2020	Awaiting carbon filter for vaccum truck to remove liquid from sump. VOC detections from surface of sump around 70ppm. No active leaks draining in sump. Marking leak complete prior to removal of product from sump because of the lower VOC detections and no active release of product into sump	2/6/2020 10:32 AM
12-SteamLineSystem-01	COMPLETE	Hydrocarbon introduction to the steam system (25 lb and 160 lb lines); nitrogen purge and two thermal oxidizers are in place to increase containment. Detections of hydrocarbons along the system have be found in Blocks 07, 08, 11, 12, and 13.	2/23/2020	3/8/2020	Continuous air monitoring along steam system to document and update leak status.	2/23/2020 3:24 PM
07-Tank16TemporaryLinetoTO-01	COMPLETE	Loose Flange near the header	1/23/2020	1/23/2020	CTEH and SRS personnel entered the facility to investigate high readings that were being detected at AreaRae location 28 at the TO on 5th St. Upon arrival, it was determined that a flange at the first 20ft line off of the manifold was leaking at the junction of two 6" braided SS lines incoming from tank 16. Peak VOC reading was 4999 ppm. Peak LEL reading was 99%. After SRS tightened the flange bolts, readings at the source trended down to non detections.	1/23/2020 6:30 AM
05-Tank33-05	COMPLETE	Tank 33-Leak Mitigation Strategy	1/1/2020	1/29/2020		
05-Tank38-02	COMPLETE	Start of de-inventory of tank 38	1/30/2020	2/1/2020	Heel in tank to be attempted for transfer using Roper pump and filter pot to tank 97.	2/6/2020 11:28 AM
05-Tank38-01	COMPLETE	Tank 38. Multiple holes on tank walls patched and leaking PRV atop tank.	1/12/2020	2/7/2020	Tank 38 heel removed to Tank 98. Awaiting filter wash and sampling - projected to be done on night shift.	2/7/2020 2:49 PM

05-VentSuction-01	COMPLETE	Flange below 90 on 3" vent suction line; in ditch near damaged walk way as line comes out of berm leading to tanks 33 and 34. Approximately 20 yards north of pipeline riser.	1/14/2020	1/25/2020	Checked flange at 90. Peak of 1.6 ppm VOCs.	1/25/2020 11:06 AM

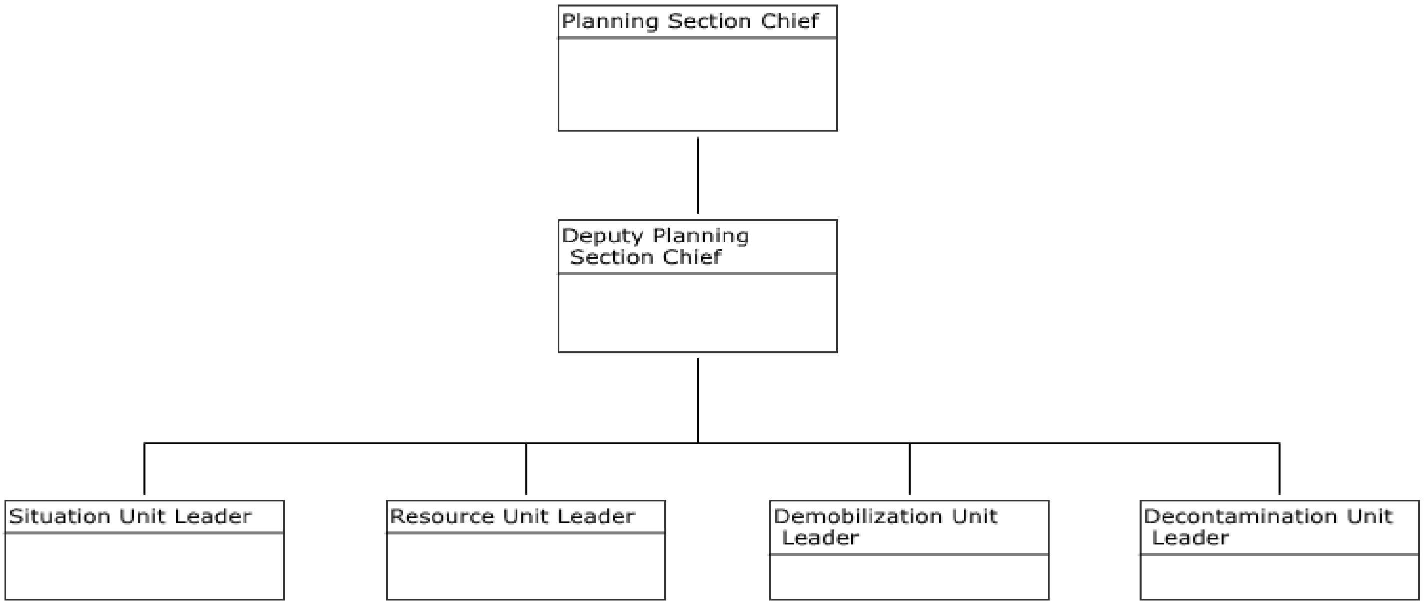
Appendix D– Unified Command Organizational Structure

ICS 207 - Organization Chart	Version Name: Combined Period 3 Redacted
Incident Name: South 4 Group Fire	Period: Period 17 [01/31/2020 09:00 - 05/01/2020 09:00]





Federal OSC
State OSC
EOC Manager
Local Government OSC
Incident Commander
EOC Safety Liaison
Safety Officer
Liaison Officer
Public Information Officer
ICS Technical Specialist
Operations Section Chief
Planning Section Chief
Logistics Section Chief
Finance Section Chief
Staging Branch Director
UAS - Aircraft Coordinator
Staging Area Manager
Recovery & Protection Branch Director
Wildlife Group Supervisor
Emergency Response Branch Director
Fire Suppression Group Supervisor
Situation Unit Leader
Resource Unit Leader
Demobilization Unit Leader
Documentation Unit Leader
Supply Unit Leader
Ground Support Unit Leader
Communications Unit Leader
Procurement Unit Leader



Planning Section Chief
Deputy Planning Section Chief
Situation Unit Leader
Resource Unit Leader
Demobilization Unit Leader
Decontamination Unit Leader

ICS 207 - Organization Chart

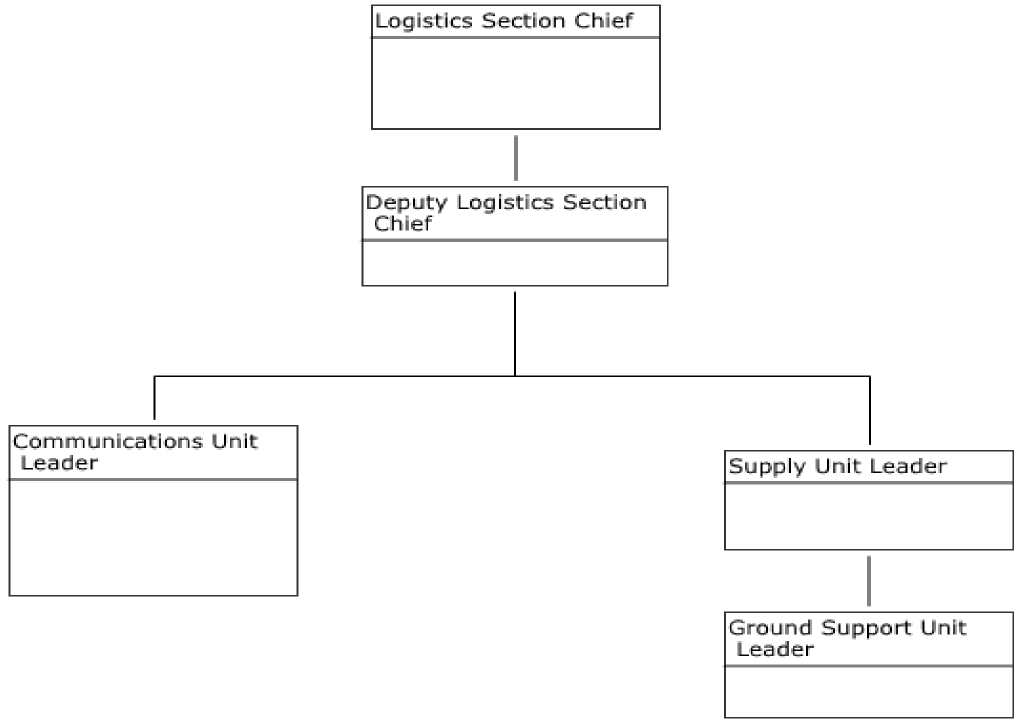
Version Name: Ops Section Redacted

Incident Name: South 4 Group Fire

Period: Period 17 [01/31/2020 09:00 - 05/01/2020 09:00]

- Operations Section Chief
  - Air Ops Group Supervisor
  - Recovery & Protection Branch Director
    - Division A Supervisor
    - Division B Supervisor
    - Division C Supervisor
    - Division D Supervisor
    - Division E Supervisor
    - Waste Management Group Supervisor
      - CTEH
  - Emergency Response Branch Director
    - Fire Suppression Group Supervisor
  - Wildlife Group Supervisor
  - Staging Branch Director
    - Huntsman Gate 44 - Staging Area Manager
    - TPC Docks Staging Area Manager
    - OPERA Staging Area
    - Main Gate Staging Area
  - Support Services Branch Director
    - Env Sampling Group
      - CTEH
      - EPA/Weston
    - SCAT Group
      - CTEH
      - TGLO
    - Air Monitoring Group
      - CTEH
      - TCEQ/NRC
      - EPA/Weston
    - Asbestos & Debris Recovery Group
      - CTEH
      - Clean Harbors (Cotton)

ICS 207 - Organization Chart	Version Name: Logistics Section Period 3 Redacted
Incident Name: South 4 Group Fire	Period: Period 17 [01/31/2020 09:00 - 05/01/2020 09:00]



Appendix E - Forms 209

ICS 209 (Oil Spill) - Incident Status Summary

Version Name: 20200416_Amended Final Created 7-29-2020 AIR

Incident Name: South 4 Group Fire

Period: Period 17 [01/31/2020 09:00 - 05/01/2020 09:00]

Spill Status (Estimated)

Source Status	**Remaining potential**	0
SECURED	**Rate of spillage**	0 barrel(s)
	Volumes measured in	ton(s)

	Since Last Report	**Total**
Total Volume Spilled	0	5,688.7

Mass Balance (Estimated) — Volumes in ton(s)

Recovered Material (Liquid)	0	0
Foam	0	6
Combusted Material (bbl)	0	5,398
Totals	**0**	**5404**

Waste (Estimated)

Type	*Recovered*	*Stored*	*Disposed*	*UOM*
Sorbent: Boom				
Debris	49.64		49.64	ton(s)
Liquid				

Shoreline Impacts — Distances measured in mile(s)

Degree of Oiling	*Affected*	*Cleaned*	*Remaining to be Cleaned*

Wildlife Impacts

					Died In Facility	
Type	*Captured*	*Cleaned*	*Released*	*DOA*	*Euth.*	*Other*
Fish Above 3"	0	0	0	0	0	0
Bird	0	0	0	0	0	0
Mammal	0	0	0	0	0	0
Reptile	0	0	0	0	0	0
2-3" Fish	0	0	0	0	0	0
Blue Crab	0	0	0	0	0	0
Pig				0		
Turtle				0		

Safety Status

Type	*Amount since last report*	*Total Amount*
Public Injury	0	0
Responder Injury	0	1
Community Air Monitoring readings for Butadiene		59,811
Community Air Readings for all analytes		161,619
BD - Community Air Detections above action level		233

Equipment Resources

Kind	*Ordered*	*Available*	*Assigned*	*Out-Of-Service*	*Total Count*
Air Monitor - AreaRAE	0	0	30	0	30
Air Monitor - MultiRAE	0	0	35	0	35
Air Monitor - UltraRAE	0	4	31	0	35
Boom	0	0	0	61,600	61,600
Crane	0	1	0	1	2
Equipment: Heavy	0	0	0	8	8
Frac Tank	0	3	0	18	21
Generator	0	0	0	40	40
Light Plants	0	0	0	33	33
Pumps	0	1	0	21	22
Roll Off Box	0	0	0	22	22
UTV	0	1	0	21	22
Vacuum Truck	0	0	0	6	6
Vehicle	0	1	0	93	94

Personnel Resources

Organization	*People in the Field*	*People in Cmd. Post*	*Total People On Scene*
Other	337	15	352
Federal	14	65	79
State	11	49	60
Local	99	70	169
RP	173	165	338
Contract Personnel	1,110	696	1,806
Totals	**1,744**	**1,060**	**2,804**

Special Notes

This does not represent a point in time, but a cumulative summary of the response event. Personnel resources reflect the entire response.

All fires were extinguished 1/4/2020.
1320 gallons of Fire Fighting Foam were used during the initial fire response, corresponds to 5.7 tons.

Notes: This represents the Air Releases (fire and leaks) air monitoring information and the collection of PACM. The OSRO response information is capture on a second 209 Report for the Outfall.
Emission calculations were based on the difference between pre- and post-event inventories, assuming the fire combusted 95% of the release; the emissions from the fugitive leaks.

Note: Wildlife: It was determined that the alligator and the pigs were not associated with this event.

Incident Name: South 4 Group Fire

Period: Period 17 [01/31/2020 09:00 - 05/01/2020 09:00]

Safety Status		
Type	*Amount since last report*	*Total Amount*
VOC - Community Air Detections above action level		10
Community Air Monitoring readings for VOC		60,132

ICS 209 (Oil Spill) - Incident Status Summary

Version Name: 20200416_Amended Final Created 7-29-2020 Outfall

Incident Name: South 4 Group Fire

Period: Period 17 [01/31/2020 09:00 - 05/01/2020 09:00]

Spill Status (Estimated)

Source Status	**Remaining potential**	0
SECURED	**Rate of spillage**	0 barrel(s)
	Volumes measured in	ton(s)

	Since Last Report	Total
Total Volume Spilled	0	82.5

Mass Balance (Estimated)		Volumes in ton(s)
Recovered Material (Liquid)	0	1.14
Foam	0	
Combusted Material (bbl)	0	0.00
Hydrocarbon Collected on site (Did Not Reach Canal		77.26
Totals	**0**	**78.4**

Waste (Estimated)

Type	Recovered	Stored	Disposed	UOM
Sorbent: Boom and debris	27		27	ton(s)
Hydrocarbon & Water	1,083		1,083	ton(s)
Hydrocarbon and Water from Sump	47		47	tons
Hydrocarbon from Separators	154		154	tons

Shoreline Impacts

Distances measured in mile(s)

Degree of Oiling	Affected	Cleaned	Remaining to be Cleaned

Wildlife Impacts

					Died In Facility	
Type	Captured	Cleaned	Released	DOA	Euth.	Other
Fish Above 3"	0	0	0	83	0	0
Bird	0	0	0	0	0	0
Mammal	0	0	0	0	0	0
Reptile	0	0	0	1	0	0
2-3" Fish	0	0	0	2,000	0	0
Blue Crab	0	0	0	42	0	0
Pig				2		
Turtle				1		

Safety Status

Type	Amount since last report	Total Amount
Public Injury	0	0
Responder Injury	0	1
Community Air Monitoring readings for Butadiene		
Community Air Readings for all analytes		161,619

Equipment Resources

Kind	Ordered	Available	Assigned	Out-Of-Service	Total Count
Air Monitor - AreaRAE	0	0	30	0	30
Air Monitor - MultiRAE	0	0	35	0	35
Air Monitor - UltraRAE	0	4	31	0	35
Boom	0	0	0	61,600	61,600
Crane	0	1	0	1	2
Equipment: Heavy	0	0	0	8	8
Frac Tank	0	0	3	18	21
Generator	0	0	0	40	40
Light Plants	0	0	0	33	33
Pumps	0	1	0	21	22
Roll Off Box	0	0	0	22	22
UTV	0	1	0	21	22
Vacuum Truck	0	0	0	6	6
Vehicle	0	1	0	93	94
Jon Boat				6	6

Personnel Resources

Organization	People in the Field	People in Cmd. Post	Total People On Scene
Other	337	15	352
Federal	14	65	79
State	11	49	60
Local	99	70	169
RP	173	165	338
Contract Personnel	1,110	696	1,806
Totals	**1,744**	**1,060**	**2,804**

Incident Name: South 4 Group Fire | Period: Period 17 [01/31/2020 09:00 - 05/01/2020 09:00]

Safety Status

Type	*Amount since last report*	*Total Amount*
BD - Community Air Detections above action level		233
VOC - Community Air Detections above action level		10
Community Air Monitoring readings for VOC		60,132

Special Notes

This does not represent a point in time, but a compilation summary of the response event. Personnel Resources reflect the entire response.

Notes: This represents the OSRO response information for the Outfall. Air Releases (fire and leaks) air monitoring information and the collection of PACM. is captured on a second 209 Report for the Air.
The amount of floating hydrocarbon material was not known as it was oils, such as lube and seal oil from equipment and un-combusted Polyblend.
Assumptions: .1% of the water from canal waste stream was liquid hydrocarbon (based on samples), .2% of the absorbent booms oil contaminated was hydrocarbon based on analytical samples; and 50% of the material collected in the Separators was hydrocarbon. Assumed that the collection efforts collected 95% of the floating hydrocarbon as the SCAT consistently indicated the material did not reach the Neches River. The total hydrocarbon recovered was estimated to be 78.4 tons. 77.26 was collected from the sumps on the PNO site. Of the 1.14 tons from Outfall 201, 1.08 tons were collected.

The waste numbers provided above reflect the total waste stream (except material balance representations).

Note: Wildlife: It was determined that the alligator and the pigs were not associated with this event.

Absorbent Booms 20400 ft; absorbent snare/mop 29000 ft; absorbent pads 7100 ea; Hard Boom 5100 ft Total Approx 61600 ft.
Vacuum Trucks: Max 10 available, max used 6; Average 3
Note: Personnel and Equipment Resources are for the TOTAL event, for Air and Outfall.

People in the Field: Others: Huntsman Personnel

Appendix F – CTEH

Community Air Monitoring and Sampling Report

THE SCIENCE OF READY℠

TPC Group

South 4 Group Fire

Community Air Monitoring and Sampling Report

Port Neches, TX

November 27, 2019

Project #112312

Report Submitted on June 30, 2020

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 DESCRIPTION OF THE INCIDENT AND RESPONSE

On November 27, 2019 at approximately 04:00 Central Standard Time (CST)[1], TPC Group (TPC) contacted CTEH®, LLC (CTEH) to provide air monitoring, air sampling, and toxicology support in response to an explosion and fire at the TPC facility located in Port Neches, Texas. The initial explosion at the TPC facility was reported to have occurred at approximately 01:00 on November 27, 2019. A second explosion occurred at approximately 11:45 on November 27, 2019. As a result of these incidents, multiple tanks containing 1,3-butadiene within the facility were compromised and actively burning[2]. CTEH supported response efforts by conducting real-time air monitoring and analytical air sampling within the TPC facility, in and around the nearby industrial areas, and within the nearby residential communities. This report summarizes air monitoring and analytical air sampling conducted by CTEH in the nearby residential communities and industrial areas (collectively referred to herein as the "community") surrounding the TPC facility from November 27, 2019 through January 30, 2020.

CTEH personnel arrived on-site on November 27, 2019 at 08:00 and began real-time air monitoring and analytical air sampling operations at approximately 9:42 in the areas surrounding the TPC facility. CTEH developed an air Sampling and Analysis Plan (Air SAP; Appendix A), which was approved by the on-site Unified Command (UC)[3]. Handheld real-time air monitoring and analytical air sampling at locations surrounding the TPC facility were focused on the chemicals of interest presented in the UC-approved Air SAP. Airborne constituents evaluated included 1,3-butadiene, volatile organic compounds (VOCs), combustion-related compounds, atmospheric flammability as a percent of the lower explosive limit (%LEL), and asbestos[4]. During the initial response, an evacuation order was issued for a 4-mile radius surrounding the TPC facility at 15:35 on November 27, 2019, which was lifted at 10:00 on November 29, 2019. On December 4, 2019 at 18:08, a shelter-in-place order for the City of Port Neches was issued due to active tank venting inside the TPC facility, resulting in a voluntary evacuation/shelter-in-place order issued at approximately 22:00. The voluntary evacuation order was lifted on December 5, 2019 at approximately 12:30.

The UC performed daily evaluations of air monitoring and analytical air sampling data collected by CTEH personnel from November 27, 2019 to January 30, 2020. On December 11, 2019, UC approved an air monitoring and sampling reduction plan to focus community monitoring and sampling within a 1-mile

[1] All time is reported in Central Standard Time.

[2] On December 4, 2019, Unified Command reported that all fires onsite had been extinguished.

[3] Unified Command (UC) was comprised of federal, state, and local representatives, including the United States Environmental Protection Agency (USEPA), the Texas Commission on Environmental Quality (TCEQ), Jefferson County, and TPC Group.

[4] Analytical air sampling for asbestos was conducted as infrastructure within the TPC facility was reported to contain asbestos containing materials.

radius of the TPC facility. On December 19, 2019, a similar air monitoring and sampling reduction plan was approved by UC to focus community monitoring and sampling within a 0.5-mile radius of the TPC facility. On January 30, 2020, UC approved a final air monitoring and sampling reduction plan, which reduced air monitoring and sampling to inside and along the fence line of the TPC facility. On that same day, UC was dissolved by the federal, state, and local representatives. CTEH personnel concluded routine community air monitoring and sampling at the end of the daytime shift on January 30, 2020. Since January 30, 2020, CTEH continued air monitoring and sampling along the fence line and inside the boundaries of the TPC facility. All air monitoring and sampling reduction plans are included in Appendix B.

2.0 CHEMICALS OF INTEREST

CTEH developed an Air Sampling and Analysis Plans (Air SAP) for the nearby community that highlights the chemicals of interest that were monitored and sampled in response to the event. was provided to representatives of the UC for their review, feedback, and approval (Appendix A). The Air SAP outlines both the air monitoring and analytical air sampling methodologies used by CTEH to assess a chemical of interest's presence or absence in air. The Air SAP also provides action levels and actions to be taken if these action levels were to be exceeded during air monitoring activities. In addition to the Air SAP, UC-approved air monitoring and sampling reduction plans (Appendix B) present the basis for changes in the geographic extent of air monitoring and analytical air sampling in the nearby community and includes updates to the chemicals of interest being evaluated based on the changing nature of the response efforts.

The primary chemicals of interest for real-time air monitoring in the community were 1,3-butadiene and other light end hydrocarbon gases (e.g., raffinate, butenes, and isobutylenes), as these were contained within tanks that were directly impacted by the fire. As it was reported that polyblend hydrocarbon products may have also been involved in the fire, benzene was also included in real-time air monitoring out of an abundance of caution due to its potential presence in these products and its low occupational exposure limit (Occupational Safety and Health Administration Permissible Exposure Limit: 1 ppm). Due to the presence of an active fire at the TPC facility, common hydrocarbon-related combustion products were also chemicals of interest for real-time air monitoring, including carbon monoxide (CO), carbon dioxide (CO_2), fine particulate matter ($PM_{2.5}$), and nitrogen dioxide (NO_2). %LEL was included to monitor for potential flammability hazards. Styrene was not present at the TPC facility; however, real-time air monitoring for styrene was included due to the usage of this chemical by neighboring facilities.

To supplement real-time air monitoring, analytical air sampling was conducted for VOCs, including 1,3-butadiene, via USEPA method TO-15. To supplement real-time air monitoring of combustion-related constituents, analytical air sampling for polycyclic aromatic hydrocarbons (PAHs) was conducted as PAHs have the potential to be produced during combustion. Additionally, as it was reported that various infrastructure within the TPC facility contained asbestos containing materials, air sampling was conducted to document and quantify the presence of airborne asbestos fibers, if any, in the nearby community.

2.1 UC-Approved Site-Specific Action Levels for Real-time Air Monitoring

UC-approved site-specific action levels for real-time air monitoring were employed in the community to provide information for UC to make decisions to limit the potential for exposure. These UC-approved site-specific action levels do not replace occupational or community exposure standards or guidelines but are intended to be a concentration limit that triggers a course of action to reduce or eliminate the potential for exposure to workers or members of the public. UC-approved site-specific action levels for the chemicals of interest were derived to be protective of the public, including sensitive populations. Site-specific action levels for the chemicals of interest were approved by UC and are provided in the Air SAP.

In addition to the UC-approve site-specific action levels in the Air SAP, two real-time air monitoring action levels were derived and implemented by UC. Sustained 1,3-butadiene detections of 0.5 parts per million (ppm) or greater, and VOC detections of 5.0 ppm or greater in the areas surrounding the TPC facility were to be communicated to the Federal On-Scene Coordinator. Sustained detections of 1,3-butadiene or VOCs above their respective UC-derived action levels resulted in the deployment of a response team consisting of members of UC including federal and state representatives. Members of the response team would deploy to the location of the readings and conduct air monitoring and evaluation in conjunction with CTEH personnel. The air monitoring data collected would be used to direct decisions by UC.

2.2 Community Exposure Guidelines for Analytical Air Sampling

At the request and approval of UC, analytical air sampling results for chemicals of interest were compared to TCEQ Air Monitoring Comparison Values (AMCVs). The TCEQ has developed these health-protective AMCVs to evaluate air sampling data over pre-defined exposure periods of short-term[5], 24-hour, or long-term (chronic; > 1 year). The AMCV is defined by the TCEQ as follows:

"Air Monitoring and Comparison Values (AMCVs) are used to evaluate the potential for effects to occur as a result of exposure to concentrations of constituents in air. AMCVs are based on data concerning health effects, odors, and vegetation effects. They are not ambient air standards. If predicted or measured above airborne levels of a constituent do not exceed the comparison level, adverse health or welfare effects would not be expected to result. If ambient levels of constituents in air exceed comparison levels, it does not necessarily indicate a problem, but rather, triggers a more in-depth review." (TCEQ, 2018)

[5] The AMCVs are developed by TCEQ as exposure value protective of human health and welfare. These are considered protective levels at which exposure is unlikely to result in adverse health effects. 24-hr AMCVs are protective of exposures up to 24-hrs, and long-term values are protective of exposures of a year or longer.

TCEQ AMCVs were used in a hierarchical approach. Analytical air sampling results for TO-15 were compared to TCEQ 24-hour AMCVs, when available. Because analytical air sampling for PAHs was conducted over two 12-hour periods, these sample results were compared to the Short-term AMCV. For those compounds that do not have a 24-hour AMCV, results were compared to the Short-term AMCV and/or the Long-term AMCV as a conservative (i.e., health-protective) comparison, in that order. However, it should be noted that the potential exposure duration to any of the chemicals associated with this incident is not consistent with chronic exposure (i.e., > 1 year) parameters used in deriving a Long-term AMCV; as such, comparisons to these Long-term AMCVs are overly conservative in nature.

3.0 METHODS

Air monitoring refers to the use of direct-reading instruments that report nearly instantaneous measurements of an airborne chemical in real-time. Real-time air monitoring provides near-instantaneous feedback of airborne chemical concentrations that can quickly indicate changing airborne chemical concentrations. Air sampling refers to the collection of discrete quantities of air using containers or chemical-specific media for further analysis in an off-site laboratory. Laboratory analysis of analytical air samples provides chemical-specific results at lower chemical detection limits than real-time air monitoring instrumentation.

3.1 Air Monitoring Methods

An air monitoring strategy was developed to monitor potential airborne chemical concentrations in the community adjacent to the TPC Facility. A map defining the areas that were included in community monitoring is included in Appendix C. Real-time air monitoring was conducted for the chemicals of interests described in Section 2.0 using handheld instruments. These instruments include the Drager X-PID 8500, RAE Systems MultiRAE Pro and UltraRAE 3000, Gastec GV-100 handheld piston pumps with chemical-specific colorimetric tubes, and TSI SidePak™ AM510/AM520 Aerosol Monitors. All instrumentation was calibrated at least once per day or per manufacturer's recommendations. All handheld air monitoring was conducted at breathing zone height.

3.2 Air Sampling Methods

CTEH collected analytical air samples in the surrounding community for laboratory analysis of airborne constituents. Maps of the analytical air sample locations are provided in Appendix D. Whole air samples for VOCs were collected using 1.4-liter evacuated canisters with a 24-hour flow controller, as this sampling duration is relevant for comparison to derived community exposures guidelines. These canisters were deployed for 24-hour periods at discrete locations, collected, and sent to a third-party National Environmental Laboratory Accreditation Program (NELAP)-accredited laboratory for analysis of VOCs, including 1,3-butadiene, in accordance with USEPA method TO-15[6]. Analytical air sampling for VOCs in

[6] Analysis also includes tentative identified compounds (TICs).

the community was conducted from November 27, 2019 through January 30, 2020. In addition, air samples were collected over a 24-hour period at two 12-hour sample collection intervals using sampling air pumps with chemical-specific sorbent media analyzed for PAHs according to the NIOSH Method 5506. Air sampling for analysis of PAHs was conducted from November 27, 2019 through December 11, 2019, at which point UC approved an air monitoring and sampling reduction plan to discontinue analysis of PAHs. As reported by UC, all fires within the TPC facility were extinguished on December 4, 2019, therefore eliminating the potential for the production of PAHs from these fires. Air sampling was also conducted to document and quantify the presence of airborne asbestos fibers (if any). All asbestos samples were sent to an American Industrial Hygiene Association (AIHA)-accredited laboratory for analysis by NIOSH method 7400 phase contrast microscopy (PCM) and NIOSH method 7402 transmission electron microscopy (TEM). From November 27, 2019 to the evening of December 16, 2019, all asbestos analytical air samples were analyzed by both PCM and TEM methods. Beginning on December 17, 2019 with the approval of UC, PCM analysis was conducted on all samples and TEM analysis was performed if there was a PCM result reported above the laboratory limit of quantitation (LoQ) for that sample. A summary of the number and location of analytical air samples collected from November 27, 2019 through January 30, 2020 for VOCs, PAHs, and asbestos is provided in Appendix E.

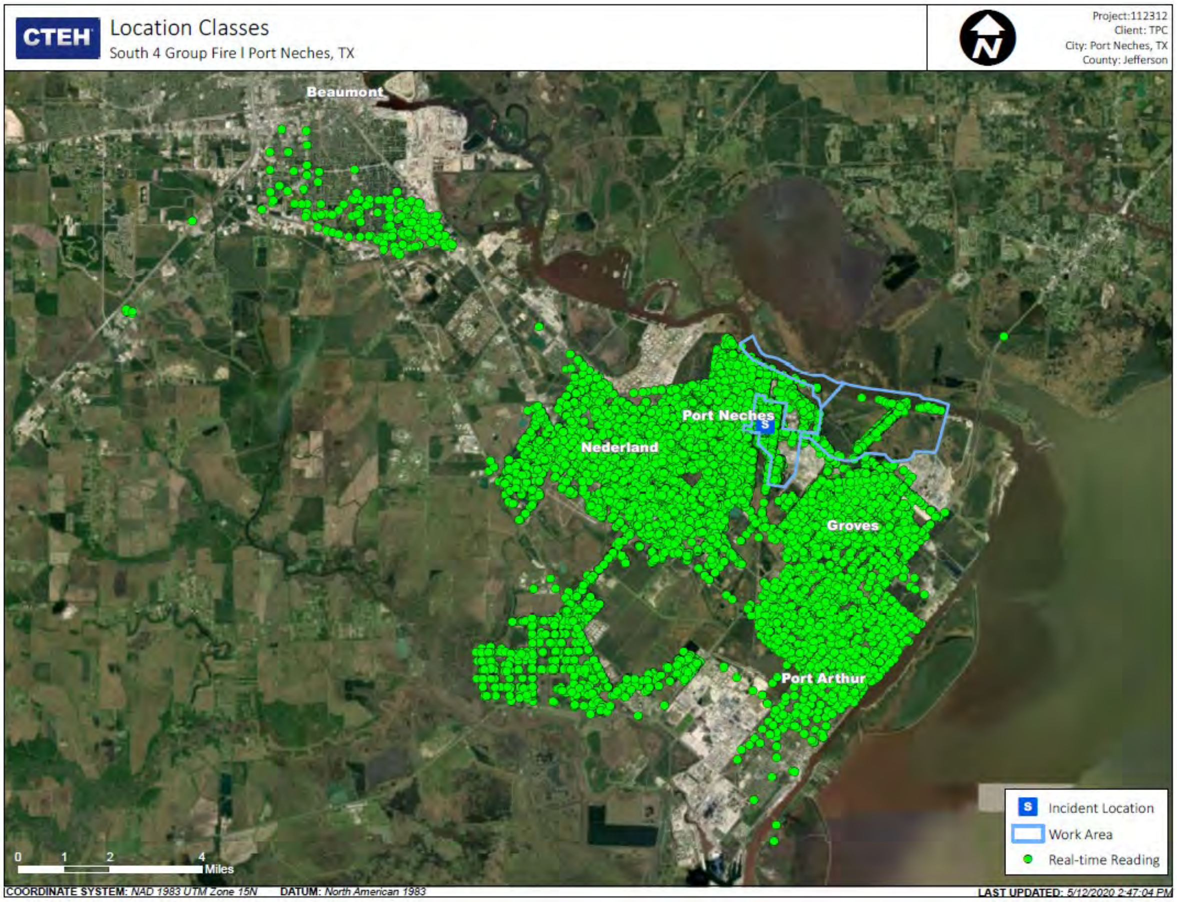
Level II data verification was conducted by Environmental Standards, a third-party data validation auditing group. Level II data verification is a systematic process that reviews sample chain-of-custody, holding time, and laboratory Quality Assurance (QA) checks. Additionally, Level IV data validation was conducted on at least 10% of the samples[7]. Level IV is a data validation methodology that includes checks for internal consistency, transmittal errors, and verification of laboratory capability. Additionally, the data are reviewed for detection limits, calibration records, target compound results, and sample results.

4.0 RESULTS

Beginning the day of the explosion (November 27, 2019), CTEH initiated real-time air monitoring and analytical air sampling efforts under the direction of UC in and around the TPC facility and within the nearby community in Port Neches, Texas. A visual depiction of the areas monitored from November 27, 2019 to January 30, 2020 with respect to geographical boundaries is provided in Figure 4.0.1.

[7] Level IV data validation was conducted on TO-15 samples only. As indicated by Environmental Standards, Level II data verification was determined to be the appropriate level of validation for PAH and asbestos analytical methods.

Figure 4.0.1 Geographical Identification of Air Monitoring Locations



Air monitoring was conducted with instruments that provide nearly instantaneous results. The results were compared to the action levels outlined in the UC-approved SAP so that UC could determine appropriate responses.

The following sections present real-time air monitoring results from the beginning of the response prior to the voluntary evacuation/shelter-in-place occurring on December 4, 2019 (November 27, 2019 through December 4, 2019), during the voluntary evacuation/shelter-in-place authorized in the City of Port Neches (December 4, 2019 through December 5, 2019), the days prior to the first air monitoring and sampling reduction plan (December 5, 2019 through December 11, 2019), the days prior to the second air monitoring and sampling reduction plan (December 11, 2019 through December 19, 2019), and until air monitoring and sampling efforts were discontinued in the community and reduced to within and around the fence line of the TPC facility (December 19, 2019 through January 30, 2020). In addition to air monitoring results, results of analytical air sampling performed from November 27, 2019 through January 30, 2020 also presented.

4.1 Community Air Monitoring Results

This section summarizes the air monitoring data collected using the methodologies described in Section 3.0 and 3.1 of this report. Maps of handheld real-time air monitoring locations by analyte are provided in Appendix C. A cumulative summary of handheld real-time air monitoring results is provided in Table 4.1.1. Summaries of handheld real-time air monitoring results for each of the specific timeframes mentioned above are provided in Tables 4.1.2 through 4.1.6 as subsets of the cumulative summary presented in Table 4.1.1. Figure 4.1.1 presents a trend graph of community real-time air monitoring readings and detections for 1,3-butadiene over the duration of the response.

Table 4.1.1 Community Handheld Real-Time Air Monitoring Results: November 27, 2019 09:42 to January 30, 2020 06:00

Analyte	Instrument	Count of Readings	Count of Detections	Range*
1,3-butadiene	Drager X-PID 8500	5,780	250	0.07 – 7.24 ppm
	Gastec #174LL	13	10	0.1 – 5 ppm
	UltraRAE	54,018	406	0.01 – 12.09 ppm
Benzene	Drager X-PID 8500	3,600	0	< 0.02 ppm
	UltraRAE	64	0	< 0.01 ppm
CO	MultiRAE	2,272	4	2 – 5 ppm
CO_2	Gastec #2LC	14	14	300 – 500 ppm
%LEL	MultiRAE	29,703	0	< 1%
NO_2	Gastec #9L	197	0	< 0.01 ppm
	MultiRAE	1,030	0	< 0.01 ppm
$PM_{2.5}$	AM510	4,036	4,036	0.001 - 0.755 mg/m^3
	AM520	694	694	0.002 - 0.134 mg/m^3
Styrene	Drager X-PID 8500	9	0	< 1 ppm
	Gastec #124L	57	0	< 0.5 ppm
VOCs	MultiRAE	60,132	498	0.1 – 12.9 ppm

*If no detections were observed, the instrument detection limit preceded by a "<" symbol is listed.

Table 4.1.2 Community Handheld Real-Time Air Monitoring Results: November 27, 2019 09:42 to December 4, 2019 16:00†

Analyte	Instrument	Count of Readings	Count of Detections	Range*
1,3-butadiene	Drager X-PID 8500	3,555	91	0.07 - 1.35
	Gastec #174LL	6	3	1 - 1.1 ppm
	UltraRAE	5,769	54	0.01 - 0.47
Benzene	Drager X-PID 8500	1,960	0	< 0.02 ppm
	UltraRAE	63	0	< 0.01 ppm
CO	MultiRAE	1,975	1	2 ppm
CO_2	Gastec #2LC	14	14	300 - 500 ppm
%LEL	MultiRAE	6,455	0	< 1 %
NO_2	Gastec #9L	197	0	< 0.1 ppm
	MultiRAE	616	0	< 0.1 ppm
$PM_{2.5}$	AM510	2,400	2,400	0.001 - 0.755
	AM520	157	157	0.002 - 0.134
VOCs	MultiRAE	9,689	118	0.1 - 0.9 ppm

†These results are a subset of the results provided in Table 4.1.1. This timeframe includes the beginning of the response prior to the voluntary evacuation/shelter-in-place occurring on December 4, 2019.
*If no detections were observed, the instrument detection limit preceded by a "<" symbol is listed.

Table 4.1.3 Community Handheld Real-Time Air Monitoring Results: December 4, 2019 16:01 to December 5, 2019 14:00†

Analyte	Instrument	Count of Readings	Count of Detections	Range*
1,3-Butadiene	Drager X-PID 8500	288	101	0.07 - 7.24 ppm
	Gastec #174LL	6	6	0.2 - 5 ppm
	UltraRAE	1,236	270	0.01 - 12.09 ppm
Benzene	Drager X-PID 8500	149	0	< 0.02 ppm
CO	MultiRAE	69	3	3 - 5 ppm
%LEL	MultiRAE	832	0	< 1 %
NO_2	MultiRAE	39	0	< 0.1 ppm
$PM_{2.5}$	AM510	186	186	0.006 - 0.22 mg/m^3
	AM520	45	45	0.009 - 0.066 mg/m^3
Styrene	Gastec #124L	39	0	< 0.5 ppm
VOCs	MultiRAE	1,446	286	0.1 - 12.9 ppm

†These results are a subset of the results provided in Table 4.1.1. This timeframe includes the voluntary evacuation/shelter-in-place authorized in the City of Port Neches.
*If no detections were observed, the instrument detection limit preceded by a "<" symbol is listed.

Table 4.1.4 Community Handheld Real-Time Air Monitoring Results: December 5, 2019 14:01 to December 11, 2019 08:00†

Analyte	Instrument	Count of Readings	Count of Detections	Range*
1,3-butadiene	Drager X-PID 8500	1,348	41	0.07 - 0.3 ppm
	UltraRAE	10,539	22	0.09 - 0.7 ppm
Benzene	Drager X-PID 8500	1,123	0	< 0.02 ppm
	UltraRAE	1	0	< 0.01 ppm
CO	MultiRAE	227	0	< 1 ppm
%LEL	MultiRAE	6,382	0	< 1 %
NO_2	MultiRAE	218	0	< 0.1 ppm
$PM_{2.5}$	AM510	1,364	1,364	0.001 - 0.37 mg/m^3
	AM520	399	399	0.004 - 0.121 mg/m^3
Styrene	Drager X-PID 8500	2	0	< 1 ppm
	Gastec #124L	18	0	< 0.5 ppm
VOCs	MultiRAE	11,870	32	0.1 - 0.4 ppm

†These results are a subset of the results provided in Table 4.1.1. This timeframe includes the days prior to the first air monitoring and sampling reduction plan.
*If no detections were observed, the instrument detection limit preceded by a "<" symbol is listed.

Table 4.1.5 Community Handheld Real-Time Air Monitoring Results: December 11, 2019 08:01 to December 19, 2019 08:00†

Analyte	Instrument	Count of Readings	Count of Detections	Range*
1,3-butadiene	Drager X-PID 8500	585	17	0.07 - 0.17 ppm
	Gastec #174LL	1	1	0.1 ppm
	UltraRAE	6,975	43	0.01 - 1.19 ppm
Benzene	Drager X-PID 8500	365	0	< 0.02 ppm
%LEL	MultiRAE	4,033	0	< 1 %
NO_2	MultiRAE	157	0	< 0.1 ppm
$PM_{2.5}$	AM510	85	85	0.003 - 0.036 mg/m^3
	AM520	93	93	0.003 - 0.014 mg/m^3
Styrene	Drager X-PID 8500	7	0	< 1 ppm
VOCs	MultiRAE	7,552	29	0.1 - 0.3 ppm

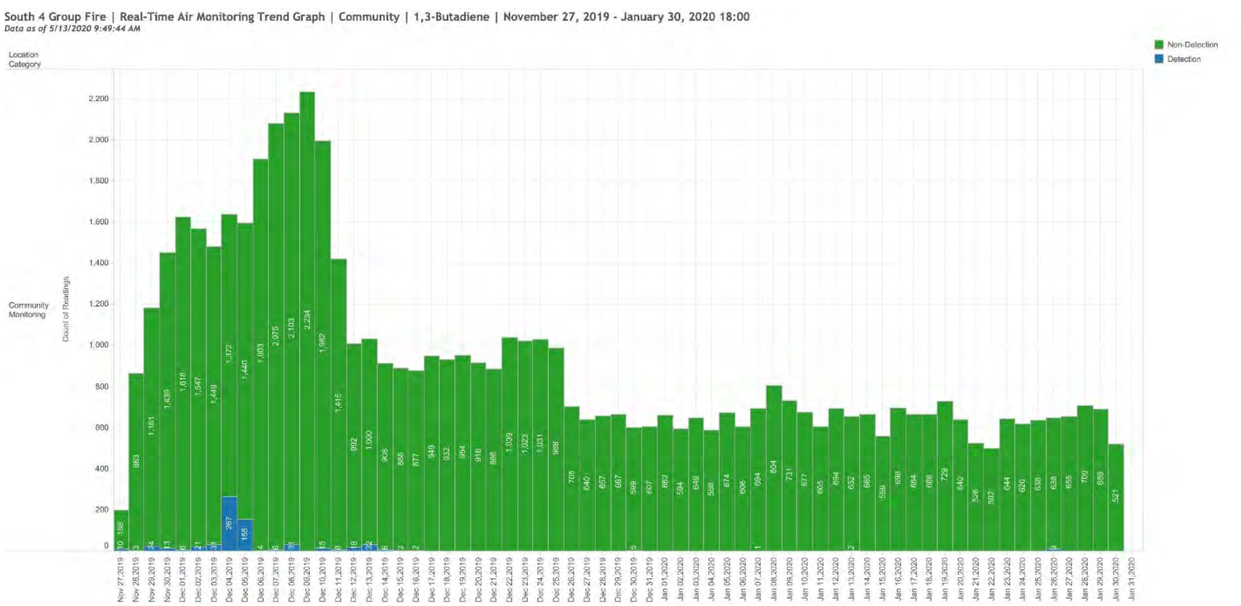
†These results are a subset of the results provided in Table 4.1.1. This timeframe includes the days prior to the second air monitoring and sampling reduction plan.
*If no detections were observed, the instrument detection limit preceded by a "<" symbol is listed.

Table 4.1.6 Community Handheld Real-Time Air Monitoring Results: December 19, 2019 08:01 to January 30, 2020 06:00†

Analyte	Instrument	Count of Readings	Count of Detections	Range*
1,3-butadiene	Drager X-PID 8500	3	0	< 0.07 ppm
	UltraRAE	29,497	17	0.03 - 1.07 ppm
Benzene	Drager X-PID 8500	3	0	< 0.02 ppm
%LEL	MultiRAE	11,999	0	< 1 %
VOCs	MultiRAE	29,574	33	0.1 - 2.5 ppm

†These results are a subset of the results provided in Table 4.1.1. This timeframe includes days until air monitoring and sampling efforts were discontinued in the community.
*If no detections were observed, the instrument detection limit preceded by a "<" symbol is listed.

Figure 4.1.1 Community Real-Time Air Monitoring Detection Trend Graph – 1,3-Butadiene



4.2 Community Analytical Air Sampling Results

In addition to real-time air monitoring efforts, analytical air sampling was conducted for VOCs, PAHs, and asbestos using the methodologies described in Section 3.2. The results in these tables are compared to TCEQ AMCV health-protective screening values, as described in Section 2.2. A summary of VOC detections from discrete analytical air samples for the chemicals of interest, as determined by UC, is provided in Table 4.2.1.A summary of analytical air sampling results for 1,3-butadiene at each sampling location is provided in Table 4.2.2. A summary of analytical sampling detections for PAHs and a summary of the results for asbestos sampling are provided in Tables 4.2.3 and Table 4.2.4, respectively. A map of analytical air sampling locations is provided in Appendix D. Comprehensive laboratory results are available for review in Appendix F.

Table 4.2.1 Summary of Outdoor Analytical Air Sample Detections – Volatile Organic Compounds (VOCs)

Analyte	Count of Samples	Count of Detections	Detection Range (ppb)	Health-Based Screening Value (ppb)
1,2,4-trimethylbenzene	893	471	0.0601 J - 5.36	3,000[B]
1,3-butadiene	893	558	0.0603 J – 1,370	430[A]
Benzene	893	892	0.0728 J - 6.16	100 [A]
Butane	893	893	0.602 - 263	92,000[B]
Ethylbenzene	893	516	0.0601 J - 2.51	20,000[B]
MTBE	893	281	0.0604 J - 124	500[B]
Naphthalene	893	78	0.154 J - 10.2	95[B]
m&p-xylene	893	796	0.0947 J - 9.29	1,700[B]
o-xylene	893	610	0.0634 J - 3.16	1,700[B]

J – The reported value is a laboratory estimate. [A] TCEQ 24-hour AMCV; [B] TCEQ Short-term AMCV

Table 4.2.2 Analytical Air Sampling Screened to 24-hour AMCVs – 1,3-Butadiene

Analyte	Location Code	Count of Samples	Count of Detections	Max Detection (ppb)	TCEQ 24-hour AMCV (ppb)	Count of Detections Over 24-hour AMCV
1,3-butadiene	AS001	1	1	0.124	430	0
	AS002	14	10	678	430	1[†]
	AS003	62	43	1,370	430	1[‡]
	AS004	14	8	286	430	0
	AS005	61	39	192	430	0
	AS006	14	7	267	430	0
	AS007	14	8	20.5	430	0
	AS008	14	7	128	430	0
	AS009	15	9	54	430	0
	AS010	5	1	0.295	430	0
	AS011	14	6	11.7	430	0
	AS012	14	5	4.8	430	0
	AS013	13	5	1.24	430	0
	AS014	5	2	1.17	430	0
	AS015	5	1	0.652	430	0
	AS016	5	3	2.49	430	0
	AS017	4	0	NA	430	0
	AS018	4	0	NA	430	0

Analyte	Location Code	Count of Samples	Count of Detections	Max Detection (ppb)	TCEQ 24-hour AMCV (ppb)	Count of Detections Over 24-hour AMCV
	AS019	14	6	0.554	430	0
	AS020	13	5	67.6	430	0
	AS021	13	6	25.9	430	0
	AS022	13	8	16.7	430	0
	AS023	12	8	26.5	430	0
	AS024	12	7	6.91	430	0
	AS025	11	5	17	430	0
	AS026	9	4	1.06	430	0
	AS027	9	5	133	430	0
	AS028	18	14	35.4	430	0
	AS029	18	6	17.4	430	0
	AS030-4	8	6	27.3	430	0
	AS030-5	7	5	24.1	430	0
	AS031-2	8	3	175	430	0
	AS032-2	8	3	188	430	0
	AS037-3	1	0	NA	430	0
	AS038	9	4	5.32	430	0
	AS039	9	4	16.5	430	0
	AS040	52	44	12	430	0
	AS041	51	42	83.6	430	0
	AS042	51	47	44.3	430	0
	AS043	9	5	15.7	430	0
	AS044	53	31	17.7	430	0
	AS045	51	37	6.88	430	0
	AS046	53	38	12.4	430	0
	AS047	52	34	7.58	430	0
	AS048	9	4	4.67	430	0
	AS049	42	22	30.6	430	0
Totals		893	558	NA	NA	2

NA = Not Applicable

†Sample PNTX1204MC002 was deployed on December 4, 2019 at 12:51 and collected on December 5, 2019 at 12:05.

‡Sample PNTX1204MC003 was deployed on December 4, 2019 at 14:58 and collected on December 5, 2019 at 12:33.

Table 4.2.3 Summary of Analytical Sampling Detections – Polycyclic Aromatic Hydrocarbons (PAHs)

Analyte	Count of Samples	Count of Detections	Detection Range ($\mu g/m^3$)	Health-Based Screening Value ($\mu g/m^3$)[A]
Acenaphthene	447	1	0.92	100
Naphthalene	447	6	1.4 – 4.9	500
Phenanthrene	447	6	0.34 - 1.6	8

[A] TCEQ Short-term AMCV

Table 4.2.4 Summary of Analytical Sampling – Integrated Asbestos Air Sampling[1]

Analytical Method	Analyte	Count of Samples[2]	Count of Detections	Range of Detections
NIOSH 7400 (PCM)	Total Fibers	1,706	34	0.003 - 0.01 f/cc
NIOSH 7402 (TEM)	Asbestos Fibers	720	0	< 0.0057 f/cc

*Laboratory non-detections are reported as less than ("<") the laboratory method reporting limit.
[1]From November 27 to the evening of December 16, all asbestos analytical air samples were analyzed by both PCM and TEM methods. Beginning on December 17, PCM analysis was run on all samples and TEM analysis was performed if there was a PCM result above the laboratory limit of quantitation (LoQ) for that sample.
[2]A total of 1,709 asbestos air samples were collected for PCM analysis; however, only 1,706 samples were able to be analyzed by the laboratory.

5.0 DISCUSSION

5.1 Community Air Monitoring

CTEH conducted real-time air monitoring throughout the community in response to the incident at the TPC facility from November 27, 2019 to January 30, 2020 for volatile organics including VOCs, 1,3-butadiene, benzene, and styrene; combustion-related constituents including CO, CO_2, NO_2, $PM_{2.5}$; and flammability as the %LEL. Throughout the duration of the response, 161,619 real-time air monitoring readings were collected throughout the areas surrounding the TPC facility. A total of 59,811 readings for 1,3-butadiene, 3,664 benzene readings, 2,272 CO readings, 14 CO_2 readings, 29,703 %LEL readings, 1,227 NO_2 readings, 4,730 $PM_{2.5}$ readings, 66 styrene readings, and 60,132 VOC readings were collected (Table 4.1.1). Throughout this timeframe there were no detections of benzene, %LEL, NO_2, or styrene via real-time air monitoring.

5.1.1 November 27, 2019 09:42 to December 4, 2019 16:00

CTEH's first real-time air monitoring reading occurred at 09:42 on November 27, 2019. Real-time air monitoring efforts within the community were focused on air monitoring for VOCs, including 1,3-butadiene, and combustion-related constituents (Table 4.1.2). From November 27, 2019 until December 4, 2019[8], there were no real-time air monitoring detections of benzene, %LEL, or NO_2. A single detection of CO at 2 ppm occurred during this timeframe. All CO_2 detections observed during this timeframe were

[8] On December 4, 2019, UC reported that all fires within the TPC facility were extinguished.

within normal ambient atmospheric levels (200-500 ppm). Particulate monitoring showed 47 air monitoring readings for $PM_{2.5}$ that were detected above the UC-approved action level of 0.138 mg/m^3. This action level is based on the Wildfire Smoke Guidelines for a 1-hour average of the upper-bound breakpoint as unhealthy concentrations for sensitive groups (USEPA, 2016). Approximately 26 of these detections occurred during the 4-mile evacuation order that was in effect from November 27, 2019 to November 29, 2019 at 10:00. After the evacuation order was lifted particulate matter detections were above the action level between 10:07 and 15:41 on November 29, 2019. In accordance with the Air SAP, all action level exceedances were reported to UC for further evaluation and to drive UC decisions. All other detections above the action level concentration were short-term, non-sustained peak detections that were not considered action level exceedances[9]. During this period, CTEH also collected 9,330 readings for 1,3-butadiene, of which there were 148 detections. Of these detections, seven were above the UC-approved action level of 0.5 ppm ranging from 0.63 to 1.35 ppm. Four of the seven detections were sustained action level exceedances. For each of these exceedances, UC was notified, and the UC response team responded to collect additional readings at each location. There were no exceedances of the UC-approved action level of 5.0 ppm VOCs during this timeframe (0.1 – 0.9 ppm).

5.1.2 December 4, 2019 16:01 to December 5, 2019 14:00

On December 4, 2019 at approximately 18:08, a voluntary evacuation/shelter-in-place was issued for the City of Port Neches in response to 1,3-butadiene detections related to the venting of 1,3-butadiene from a storage tank within the facility. Between December 4, 2019 at 16:00 and when the shelter-in-place order was lifted (December 5, 2019 at 14:00), there were no detections of benzene, %LEL, NO_2, or styrene in the community areas surrounding the TPC facility (Table 4.1.3). A single $PM_{2.5}$ detection was above the UC-approved action level; however, this detection was not sustained, and no smoke plume was present at the time of the detection. CTEH also collected 1,446 VOC readings, with 11 detections ranging from 5.1 to 12.9 ppm. Ten of the 11 detections were sustained for 5 minutes above the UC-approved action level of 5.0 ppm. The majority of these detections occurred southeast of the facility. During the shelter-in-place, 377 readings were collected for 1,3-butadiene, of which 224 readings ranged from 0.51 to 12.09 ppm. Of these 224 real-time detections, 81 detections ranged from 0.5 to 1.0 ppm, and 142 detections ranged from 1.01 ppm to 7.8 ppm. Only one detection of 1,3-butadiene exceeded 10 ppm at 12.09 ppm. A discussion of these detections in comparison to emergency exposure guidelines is provided below. All action level exceedances were communicated to UC; these readings were evaluated by members of UC and the City of Port Neches and used to authorize a voluntary evacuation/shelter-in-place.

For purposes of comparison, the detections of 1,3-butadiene can be compared to exposure concentrations developed for emergency events. Collectively, these are summarized by the United States

[9] In accordance with the SAP, an action level exceedance is defined as a detection above an action level, sustained for a predetermined period of time (i.e., 5 or 15 minutes).

Department of Energy (US DOE) Protective Action Criteria (PAC) values derived specifically for emergency events. As stated by the Emergency Management Issues Special Interest Group (EMI SIG; sponsored by US DOE), PAC values are

“essential components for planning and response to uncontrolled releases of hazardous chemicals. These criteria, combined with estimates of exposure, provide the information necessary to evaluate chemical release events for the purpose of taking appropriate corrective action. During an emergency response, these criteria may be used to evaluate the severity of the event, to identify potential outcomes, and to decide what protective action should be taken. These criteria may also be used to estimate the severity of consequences of an uncontrolled release and to plan for an effective emergency response.” (EMI SIG, 2019)

For individual chemicals, the PAC values dataset takes a hierarchical approach:

- Use Acute Exposure Guideline Levels (AEGL) values published by the USEPA, if available;
- If AEGLs are not available, use Emergency Response Planning Guidelines (ERPG) values produced by AIHA; or
- If neither AEGL or ERPG values are available, use Temporary Emergency Exposure Limit (TEEL) values developed by the Subcommittee on Consequence Assessment and Protective Actions (SCAPA).

These values are used for emergency planning and responding and are expressed as specific concentrations of airborne chemicals at which health effects may occur. AEGL and ERPG values are expressed in a three-tiered scale based on the severity of the health effect caused by the exposures. The AEGL and ERPG structures and values are as follows:

- AEGL – 1: Notable discomfort. Irritation, or certain asymptomatic non-sensory effects. However, these effects are not disabling and are transient and irreversible upon cessation of exposure;
- AEGL – 2: Irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape; or
- AEGL – 3: Life-threatening health effects or death

Table 5.1.2.1 provides the USEPA AEGL values for 1,3-butadiene.

Table 5.1.2.1 USEPA AEGL Values for 1,3-Butadiene

	10 Minutes	30 Minutes	60 Minutes	4 hours	8 Hours
AEGL – 1	670 ppm	670 ppm	670 ppm	670 ppm	670 ppm

AEGL – 2	6,700 ppm*	6,700 ppm*	5,300 ppm*	3,400 ppm*	2,700 ppm*
AEGL – 3	27,000 ppm***	27,000 ppm***	22,000 ppm***	14,000 ppm**	6,800 ppm*

* = > 10% lower explosive limit; ** = > 50% lower explosive limit; AEGL 3 – 10 minutes = **9,700 ppm

Within the ERPG structure, similar to AEGLs, effects are predicted on a three-tiered scale by the severity of the effect by the exposures as follows:

- ERPG – 1: The maximum concentration in air below which nearly all individuals could be exposed for up to one hour without experiencing effects other than mild transient adverse health effects or perceiving a clearly defined objectionable odor;
- ERPG – 2: The maximum concentration in air below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their abilities to take protective action; or
- ERPG – 3: The maximum concentration in air below which nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

Table 5.1.2.2 provides the AIHA ERPG values for 1,3-butadiene.

Table 5.1.2.2 AIHA ERPG Values for 1,3-Butadiene

	1-hour ERPG
ERPG – 1	10 ppm
ERPG – 2	50 ppm
ERPG – 3	5,000 ppm

Only one non-sustained peak reading of 1,3-butadiene at a concentration of 12.09 ppm was above 10 ppm both during this timeframe (December 4, 2019 16:00 to December 5, 2019 14:00) and throughout the entire duration of the response in areas surrounding the TPC facility; the reading occurred at 17:58 on December 4, 2019 at the north end of Earle St. in Port Neches. This concentration of 1,3-butadiene is slightly above the ERPG – 1 concentration of 10 ppm and orders of magnitude below the 10-minute to 8-hour AEGL– 1 concentration of 670 ppm. It is important to note that the ERPG – 1 is a 1-hour comparison value, whereas the maximum 1,3-butadiene detection represents a non-sustained peak reading. As such, the detected concentrations of 1,3-butadiene were not at a level representing a human health concern. Further, at no point during the response were detected concentrations of 1,3-butadiene in the nearby community above the ERPG – 2/AEGL – 2 or the ERPG – 3/AEGL – 3. To supplement real-time air monitoring, analytical air sampling locations were present in the areas associated with the 12.09 ppm detection of 1,3-butadiene. These samples collected ambient air over a 24-hour period to allow for the comparison of airborne concentrations to TCEQ AMCVs as discussed in Section 5.2 below.

5.1.3 December 5, 2019 14:01 to December 11, 2019 08:00

At 09:45 on December 5, 2019, the active venting of 1,3-butadiene ceased. From 09:19 to 13:39 on December 5, 2019, 186 1,3-butadiene readings and 178 VOC readings were collected. Of these, seven detections of 1,3-butadiene (ranging from 0.11 to 0.49 ppm) and four detections of VOCs (ranging from 0.1 to 0.4 ppm) occurred. None of these detections exceeded the UC-approved action level for 1,3-butadiene or VOCs. Based on these data, the City of Port Neches lifted the shelter-in-place order on December 5, 2019 at 14:00. From December 5, 2019 14:01 to December 11, 2019 08:00, CTEH continued to monitor for benzene, CO, %LEL, NO_2, and styrene and no detections of these constituents occurred (Table 4.1.4). During this timeframe, CTEH also collected 11,887 readings for 1,3-butadiene, of which two detections were above the UC-approved action level. These detections (0.51 and 0.7 ppm) occurred on December 6, 2019 within approximately 30 minutes of each other. Only one of these detections was sustained above the UC-approved action level (0.51 ppm). There were no other exceedances during this timeframe. As such, UC reviewed and approved an air monitoring and sampling reduction plan on December 11, 2019, which focused air monitoring and sampling efforts within a 1-mile radius of the TPC facility, in addition to discontinuing real-time air monitoring for combustion-related constituents.

5.1.4 December 11, 2019 08:01 to December 19, 2019 08:00

From December 11, 2019 at 08:01 to December 19, 2019 at 08:00, air monitoring resulted in no detections of benzene, %LEL, NO_2, or styrene (Table 4.1.5). All detections of $PM_{2.5}$ were below the UC-approved action level and within normal ambient air ranges. CTEH collected 7,563 readings for 1,3-butadiene, of which there were 61 detections; none of the 1,3-butadiene detections were above the UC-approved action level. A total of 7,553 readings for VOCs were collected; of these readings none of the 29 VOC detections were above the UC-approved action level. On December 19, 2019, UC approved a second air monitoring and sampling reduction plan to focus community air monitoring and sampling efforts to a 0.5-mile radius around the TPC facility.

5.1.5 December 19, 2019 08:01 to January 30, 2020 06:00

Following the approval of the second air monitoring and sampling reduction plan, CTEH continued to monitor for 1,3-butadiene, benzene, %LEL, and VOCs (Table 4.1.6). No detections of benzene or %LEL occurred during this air monitoring period. Approximately 29,501 readings for 1,3-butadiene were collected. On December 30, 2019, two detections of 1,3-butadiene (0.79 and 1.07 ppm) were reported above a concentration of 0.5 ppm. These detections occurred near the intersection of Hwy 136 and Grigsby Ave between 20:50 and 21:30. However, both of these readings were short-term, non-sustained peak detections. Based on the UC-approved Air SAP, because these detections were not sustained, they were not action level exceedances that required further action by the UC response team. Of the 29,574 readings collected for VOCs, there were no exceedances of the UC-approved action level. Following the collection and evaluation of air monitoring and sampling data during this period, UC approved the discontinuation of air monitoring and sampling in the community surrounding the TPC facility. Following January 30, 2020 air monitoring and sampling efforts were focused on the fence line of the TPC facility at the recommendation and approval of UC.

5.2 Community Air Sampling

In total, 893 1.4-liter canisters deployed for 24-hour periods were collected and analyzed using USEPA method TO-15 for VOCs[10]. Results for the chemicals of interest selected and approved by UC were compared to TCEQ AMCV health-protective air screening values as discussed in Section 2.2. Specifically, concentrations of detected analytes were compared to TCEQ's 24-hour AMCVs, when available. If 24-hour AMCVs were not available, sampling results were compared to TCEQ Short-term AMCVs.

All 24-hour VOC canister samples collected during the response reported concentrations for the chemicals of interest below their respective health-based screening values (Table 4.2.1) with the exception of two samples collected on December 4, 2019 which reported detections of 1,3- butadiene above the 24-hour AMCV value of 430 ppb (Table 4.2.2). These samples were collected at the corner of Gist Dr. and Saba Ln. (Sample ID PNTX1204MC002; 678 ppb) and Earle St. and Magnolia Ave. (Sample ID PNTX1204MC003; 1,370 ppb) in Port Neches, Texas during the time in which a shelter-in-place/voluntary evacuation order was issued for the City of Port Neches. These canisters were deployed between 12:30 and 14:00 on December 4, 2019, and were collected between 12:00 and 12:30 on December 5, 2019, thus capturing the ambient air concentration of 1,3-butadiene in this area over the course of the shelter-in-place/voluntary evacuation.

While the two sample results reported above exceed the 24-hour AMCV, these exceedances were limited both in frequency and magnitude. The maximum reported 1,3-butadiene concentration of 1,370 ppb (1.37 ppm) was below the short-term AMCV concentration of 1,700 ppb (1.7 ppm). As defined by the TCEQ, the 24-hour AMCV value is an estimate of an inhalation exposure concentration that is likely to be without appreciable risk of adverse effects to the human population (including susceptible subgroups) for a 24-hour exposure. The American Conference of Governmental Industrial Hygienists (ACGIH) sets Threshold Limit Value (TLV) time-weighted averages (TWA) for chemicals, which are chemical concentrations to which a worker could be exposed daily for a working lifetime and not expect to see adverse health impacts. The ACGIH TLV-TWA for 1,3-butadiene is 2,000 ppb (2 ppm), which means workers could be exposed to 1,3-butadiene at concentrations greater than either of the 24-hour detected concentrations discussed above for their working lifetime and not expect adverse health effects. In addition, as these

[10] Sampling was suspended between November 28 and December 2, 2019 at stations AS003 and AS005 due to on-site operations.

concentrations were reported during a timeframe in which a shelter-in-place was issued, the potential for exposure would be further limited. It should be noted that no other samples collected and analyzed reported concentrations above the 24-hour AMCV at these locations or any other sampling location throughout the duration of the response.

A total of 447 samples were collected for PAHs in the community from November 27, 2019 through December 11, 2019. A total of one detection of acenaphthene, six detections of naphthalene, and six detections of phenanthrene were observed during this timeframe. Each detection observed was reported below the TCEQ AMCV health-protective air screening values for these compounds (Table 4.2.3). Based on the fire being extinguished on December 4, 2019 and an evaluation of these results, PAH analysis for analytical air samples was discontinued after approval of the air monitoring and sampling reduction plan by UC on December 11, 2019.

From November 27, 2019 to January 30, 2020, 1,706 air samples were analyzed for asbestos fibers via PCM analysis and subsequent TEM analysis, as described in Section 3.2. As shown in Table 4.2.4, there were no detections of asbestos fibers via TEM analysis above the method reporting limit. As such, no asbestos fibers were detected by stationary air sampling in the community during the response.

6.0 CONCLUSION

In support of the response efforts, CTEH followed the UC-approved air monitoring and sampling plans to conduct both real-time air monitoring and analytical air sampling to assess the potential for airborne chemical exposures within the nearby communities surrounding the TPC facility.

Throughout the response, the air monitoring and sampling data collected by CTEH was provided to the federal, state, and local representatives of UC to allow UC to make informed decisions with regard to air quality to limit the potential for exposure in the nearby community. The air monitoring and sampling data enabled emergency responders and response workers to take appropriate courses of action (i.e., evacuation, shelter-in-place). The cumulative air monitoring and analytical air sampling data collected by CTEH and provided to UC throughout the response is summarized in this report. The CTEH air monitoring and sampling data indicate that there was no adverse impact on public health in the community from November 27, 2019 to January 30, 2020 as a result of the South 4 Group Fire.

7.0 REFERENCES

ACGIH (2020) Documentation of Threshold Limit Values and Biological Exposure Indices. Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists.

DOE/SCAPA (2016) Protective Action Criteria (PAC): Chemicals with AEGLs, ERPGs, & TEELS: Rev. 29. Washington, DC: U. S. Department of Energy. Available at:

https://www.energy.gov/ehss/protective-action-criteria-pac-aegls-erpgs-teels-rev-29-chemicals-concern-may-2016.EMI SIG (2019) Protective Action Criteria for Chemicals-Including AEGLs, ERPGs, &TEELSs: Emergency Management Issues Special Interest Group. Available at: https://sp.eota.energy.gov/EM/SitePages/SCAPA-CPT.aspx

TCEQ (2008) Development Support Document: 1,3-Butadiene. Available at: https://www.tceq.texas.gov/assets/public/implementation/tox/dsd/final/butadiene,%201,3-.pdf

TCEQ (2018) Air Monitoring Comparison Values. Available at: https://www.tceq.texas.gov/cgi-bin/compliance/monops/agc_amcvs.pl

USEPA (2016) Wildfire Smoke: A Guide for Public Health Officials. United States Environmental Protection Agency.

USEPA (2019) Acute Exposure Guideline Levels for Airborne Chemicals. Washington, D. C.: United States Environmental Protection Agency. Available at: https://www.epa.gov/aegl.

Appendix A

CTEH Air Sampling and Analysis Plans

THE SCIENCE OF READY℠

South 4 Group Fire

Port Neches, TX

Preliminary Air Sampling and Analysis Plan

(SAP)

Version 1.0

Prepared on behalf of:

TPC Group

Prepared By:

CTEH, LLC
5120 Northshore Drive
North Little Rock, AR 72118
501-801-8500

November 27, 2019

	Name/Organization	Signature	Date Signed
Prepared by:	Shawn Wnek, PhD, DABT		11/27/2019
Reviewed by:	Linda Easton, Proj. Mngr.	Linda Easton	11/27/2019
Approved by:	JASON SANDERS, LOFR		11/29/2019
Approved by:	Michael Wright		11/29/2019
Approved by:	Hope Daniels	Hope Daniels	11/29/2019
Approved by:	ADAM ADAMS EPA	OSC	11/29/2019
Approved by:			
Approved by:			

Air Monitoring and Sampling Strategy

CTEH® is focusing on the mixtures, chemicals, and indicators of flammability chosen below because they are among the most important and readily monitored hazards of light end hydrocarbons mixtures (including raffinate, 1,3-butadiene, butene) and associated combustion products. Monitoring and sampling for some chemicals or associated indicators may be conducted less frequently or even discontinued as initial air monitoring and sampling results indicate that these chemicals and indicators do not pose a health concern.

The strategy is to utilize three broadly-defined monitoring plans: 1) Worker Monitoring; 2) Community Assessment; and 3) Site Assessment. Worker Monitoring will generally take place in the presence of workers performing/supporting mitigation and remediation operations. The readings will generally be taken at a height consistent with that of the sampler's breathing zone and in close proximity to workers without interfering or obstructing their work tasks. Community Assessment may take place in those residential and commercial locations immediately surrounding the incident site, not necessarily currently occupied by members of the community. Unlike Worker Monitoring and Community Assessment, Site Assessment does not necessarily represent ambient air monitoring near breathing zone level. Site Assessment may involve a variety of different monitoring tasks intended to provide information that may help to delineate the nature and extent of the release (e.g. fence line monitoring, worst case determination, container head space, ground level, etc.).
Free-roaming handheld real-time air monitoring may be conducted in a variety of areas based on levels of activity, proximity to the release/source area, and site conditions.

Discrete air samples may be collected in all monitoring areas and sent to an off-site laboratory for chemical analysis. These analytical air sampling techniques may be used to provide air quality data beyond the scope of real-time instruments. When necessary, discrete air samples may be collected on individual workers (personal sampling) to provide exposure data over the course of a work shift for more direct comparison to occupational exposure values.

CTEH® Site-Specific Action Levels

CTEH site-specific action levels may be employed in all air monitoring plans to provide information for corrective action to limit potential exposures. These values do not replace occupational or community exposure standards or guidelines, but are intended to represent a concentration limit that triggers a course of action to better address worker and public safety. Action level exceedances will be communicated to Site Management and the CTEH Project Technical Director by the CTEH Project Manager (PM). Work practices may be assessed and then altered if necessary. Site-Specific action levels are not utilized for Site Characterization monitoring.

Plan 1: Worker Monitoring
Analytes and Parameters

Objective: Report air levels before they reach those requiring respiratory protection within the fenceline of the facility and designated work areas.

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs** (as 1,3-butadiene)	0.5 ppm 5 min	Confirm reading with secondary instrument specific to 1,3-butadiene/benzene.	OSHA PEL Action Level of 0.5 ppm	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	0.6 (10.6 eV Lamp)
1,3-butadiene	0.5 ppm 5 min	Exit Area or don air purifying respirator; report reading to PM. PM will report readings to site management and additional site controls may be implemented.	OSHA PEL Action Level of 0.5 ppm	Drager X-pid 8500	0.07 ppm	LOQ Range: 0.2-25 ppm	NA
				UltraRAE PID	0.1 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec #174LL	0.1 ppm	Range: 0.5-5 ppm (vol. variable)	See insert.
1,3-butadiene	5 ppm 5 min	Exit Area or don air purifying respirator; report reading to PM. PM will report readings to site management and additional site controls may be implemented	OSHA -STEL (5 ppm)	Instruments as above	--	--	--
Butane	500 ppm 5 min	Monitor for oxygen deficiency and verify sustained level	½ ACGIH TLV STEL for aliphatic hydrocarbons $C_1 – C_4$	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	67 (10.6 eV Lamp)
				Gastec tube #104	5 ppm	Measuring Range: 25 - 1,400 ppm Volume: Var.	See Tube Insert
Benzene	0.5 ppm 5 min	Exit Area or don air purifying respirator; report readings to PM	OSHA PEL Action level/ACGIH TLV-TWA	Drager X-pid 8500	0.02 ppm	Measuring Range: 0.02-25 ppm	NA
				UltraRAE PID	0.025 ppm	UltraRAE-Change SEP tube frequently	NA
				Gastec tube #121L	0.05	Range: 0.1-65 ppm Volume: Variable	See insert.
Benzene	5 ppm Sustained	Exit Area or don air purifying respirator; move upwind; report readings to PM	OSHA STEL	Drager X-pid 8500	0.02 ppm	Measuring Range: 0.02-25 ppm	NA
				UltraRAE PID	0.025 ppm	UltraRAE-Change SEP tube frequently	NA

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
				Gastec tube #121L	0.05	Range: 0.1-65 ppm Volume: Variable	See insert.

** Note that additional analytes are detectible on the MultiRAE PID with the following correction factors: benzene (0.47), butadiene (0.6); 1-butene (0.9); butane (67); isobutane (2.1); isobutylene (1.0); 4-vinylcyclohexane (0.56); dicyclopentadiene (0.47); tert-butyl methyl ether ((0.9); isopentane (8.2); ethylbenzene (0.47); xylene (0.42).

Combustion By-Products: Analytes and Parameters*

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Particulate Matter ($PM_{2.5}$ or PM_{10})**	351 µg/m^3 5 min	Report reading to PM	Wildfire Smoke Guidelines for 1 hr avg. upper-bound breakpoint for unhealthy AQI	SidePak AM510	0.001 mg/m^3	PM2.5 impactor – 50% cut-off at 2.5 micron PM10 impactor – 50% cut-off at 10 micron	NA
$PM_{2.5}$ or PM_{10}	200 µg/m^3 8 hrs	Report reading to PM	See above - 8 hr guideline	SidePak AM510	0.001 mg/m^3	See above	NA
Carbon monoxide (CO)	25 ppm 5 min	Report reading to PM	ACGIH® TLV – Reading sustained for 5 minutes	MultiRAE Sensor	1 ppm	Range: 0 – 500 ppm	NA
				Gastec tube #1LC	0.5 ppm	Range: 1 – 30 ppm Volume: 100 mL	1
Carbon Dioxide (CO_2)	5,000 ppm 5 min	Report reading to PM	ACGIH® TLV – Reading sustained for 5 minutes	MultiRAE Sensor	100 ppm	Range: 0 – 50,000 ppm	NA
				Gastec tube #2LC	20 ppm	Range: 100 – 2,000 ppm Volume: Var.	See insert
				Gastec tube #2LL	30 ppm	Range: 300 – 5,000 ppm Volume: Var.	See insert
Nitrogen dioxide (NO_2)	0.2 ppm 5 min	Report reading to PM	ACGIH TLV – Reading sustained for 5 minutes	MultiRAE PID	1 ppm	Range: 1 – 5,000 ppm	16
				MultiRAE Sensor	0.1 ppm	Range: 0 – 20 ppm	NA
				Gastec tube #9L	0.1 ppm	Range: 0.5 – 125 ppm Volume: Var.	Var.

*Monitoring for combustion products will be conducted if a fire is reported during CTEH air monitoring. **$PM_{2.5}$ is especially prone to interference from high humidity, in cases of high humidity, PM_{10} impactors may be used which are not as sensitive to humidity. In general, correction factors may be used to adjust PM readings for humidity. Monitoring for combustion products may be discontinued when the fire is extinguished.

Flammability*								
Analyte	Action Level	Corrected Value	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
%LEL	1 % 1 min	1.8 % ~2.0%	Notify PM, Facilitate communication with site contact.	Detectible LEL	MultiRAE Sensor	1 %	Measuring range: 1 – 100%	1.8
%LEL	5 % 1 min	10 %	Exit area and Notify PM	10% of LEL	MultiRAE Sensor	1 %	Measuring range: 1 – 100%	1.8

* LEL Action Levels based on LEL Sensor Correction Factor for 1-3 Butadiene (1.8) rounded to 2 as conservative estimate.

Plan 2: Community Monitoring

Analytes and Parameters

Objective: Report air levels before they reach those causing nuisance or health issues

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs**	0.5 ppm 5 min	Report reading to PM; Collect a 1,3-butadiene specific reading with secondary instrument.	Preliminary UC Action Level	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	0.6 (10.6 eV Lamp)
Total VOCs (UC Action Leve)†	5.0 ppm Sustained	Report reading to PM; Collect a 1,3-butadiene specific reading; notify and report reading to Unified Command for Strike Team assessment	UC Action Level	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	0.6 (10.6 eV Lamp)
1,3-butadiene	Any Detect	Report reading to PM; verify with secondary instrument.	Inform PM/PTD of potential off-site issues	Drager X-pid 8500	0.07 ppm	LOQ Range: 0.2-25 ppm	NA
				UltraRAE PID	0.1 ppm	UltraRAE - Change SEP tube frequently	NA
1,3-butadiene (UC Action Level) †	0.5 ppm 5 min	Report reading to PM/PTD; notify and report reading to Unified Command for Strike Team assessment	Inform PM/PTD/UC of potential off-site issues	Gastec #174LL	0.1 ppm	Range: 0.5-5 ppm (vol. variable)	See insert.
Benzene	0.5 ppm 5 min	Report reading to PM/PTD; report reading to Incident/Unified Command	Inform PM/PTD/UC of potential off-site issues	Drager X-pid 8500	0.02 ppm	Measuring Range: 0.02-25 ppm	NA
				UltraRAE PID	0.025 ppm	UltraRAE-Change SEP tube frequently	NA

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
				Gastec tube #121L	0.05	Range: 0.1-65 ppm Volume: Variable	See insert.
Butane	Any Detect	Sample as requested; Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	67 (10.6 eV Lamp)
				Gastec tube #104	5 ppm	Measuring Range: 25 - 1,400 ppm Volume: Var.	See Tube Insert

** Note that additional analytes are detectible on the MultiRAE PID with the following correction factors: benzene (0.47), butadiene (0.6); 1-butene (0.9); butane (67); isobutane (2.1); isobutylene (1.0); 4-vinylcyclohexane (0.56); dicyclopentadiene (0.47); tert-butyl methyl ether ((0.9); isopentane (8.2); ethylbenzene (0.47); xylene (0.42). † If action level is exceeded, members of Unified Command will be notified and members of State, Federal, and 3rd party contractors will respond to location of exceedance to collect additional verification monitoring with multiple instruments to assess air quality and evaluate the need for further action.

Combustion By-Products: Analytes and Parameters

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Particulate Matter ($PM_{2.5}$ or PM_{10})**	138 μg/m³ 5 min	Report reading to PM	Wildfire Smoke Guidelines for 1 hr. avg. upper-bound breakpoint for unhealthy for sensitive groups AQI	SidePak AM510	0.001 mg/m³	PM2.5 impactor – 50% cut-off at 2.5 micron PM10 impactor – 50% cut-off at 10 micron	NA
$PM_{2.5}$ or PM_{10}	79 μg/m³ 8 hrs	Report reading to PM	See above - 8 hr guideline	SidePak AM510	0.001 mg/m³	See above	NA
Carbon monoxide	25 ppm 5 min	Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE Sensor	1 ppm	Range: 0 – 500 ppm	NA
				Gastec tube #1LC	0.5 ppm	Range: 1 – 30 ppm Volume: 100 mL	1
Carbon Dioxide	5,000 ppm 5 min	Report reading to PM	Inform PM/PTD of potential off-site issues. 1/6 of PAC-1 value of 30,000 ppm.	MultiRAE Sensor	100 ppm	Range: 0 – 50,000 ppm	NA
				Gastec tube #2LC	20 ppm	Range: 100 – 2,000 ppm Volume: Var.	See insert
				Gastec tube #2LL	30 ppm	Range: 300 – 5,000 ppm Volume: Var.	See insert
Nitrogen dioxide	0.2 ppm 5 min	Report reading to PM		MultiRAE PID	1 ppm	Range: 1 – 5,000 ppm	16
				MultiRAE Sensor	0.1 ppm	Range: 0 – 20 ppm	NA

Inform PM/PTD of potential off-site issues. >1/2 of AEGL-1 Value of 0.5 ppm.	Gastec tube #9L	0.1 ppm	Range: 0.5 – 125 ppm Volume: Var.	Var.

**$PM_{2.5}$ is especially prone to interference from high humidity, in cases of high humidity, PM_{10} impactors may be used which are not as sensitive to humidity. In general, correction factors may be used to adjust PM readings for humidity. Monitoring for combustion products may be discontinued when the fire is extinguished.

Flammability*

Analyte	Action Level	Corrected Value	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
%LEL	1 % 1 min	1.8 % ~2.0%	Notify PM, Facilitate communication with site contact.	Detectible LEL	MultiRAE Sensor	1 %	Measuring range: 1 – 100%	1.8
%LEL	5 % 1 min	10 %	Exit area and Notify PM	10% of LEL	MultiRAE Sensor	1 %	Measuring range: 1 – 100%	1.8

* LEL Action Levels based on LEL Sensor Correction Factor for 1-3 Butadiene (1.8) rounded to 2 as conservative estimate.

Plan 3: Site Assessment

Objective: Characterize nature and extent of release.

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs (as 1,3-butadiene)	NA	Report reading to PM	NA	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	0.6 (10.6 eV Lamp)
1,3-butadiene	NA	Report reading to PM	NA	Drager X-pid 8500	0.07 ppm	Range: 0.02-25 ppm	NA
				UltraRAE PID	0.1 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec #174LL	0.1 ppm	Range: 0.5-5 ppm (vol. variable)	See insert.
Butane	NA	Report reading to PM	NA	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	67 (10.6 eV Lamp)
				Gastec tube #104	5 ppm	Measuring Range: 25 - 1,400 ppm Volume: Var.	See Tube Insert
Benzene	NA	Report reading to PM	NA	Drager X-pid 8500	0.02 ppm	Measuring Range: 0.02-25 ppm	NA

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
				UltraRAE PID	0.025 ppm	UltraRAE-Change SEP tube frequently	NA
				Gastec tube #121L	0.05	Range: 0.1-65 ppm Volume: Variable	See insert.
%LEL	5%	Exit area and notify PM	10% LEL	MultiRAE Sensor	1%	Measuring Range: 1-100%	Correction factor of 2.0

Potential Analytical Methods

Analyte	Media/Can	Method	Notes
VOCs	MiniCans	EPA TO-15+TICs	
1,3-Butadiene	3M 3520 Badge or Assay 566	Modified NIOSH 1500/1501	
Benzene	3M 3520 Badge or Assay 566	Modified NIOSH 1500/1501	
Asbestos	PCM/TEM-Asbestos 25 mm cellulose cassette	NIOSH method 7400	
PAH-Profile	37PTFE 2.0/Treated Amberlite XAD-2	NIOSH Method 5506	

General Information on Procedures (Assessment Techniques) Used

Procedure	Description
Real-Time Handheld Survey	CTEH staff members may utilize handheld instruments (e.g. MultiRAEs; UltraRAEs; Drager PID, Gastec colorimetric detector tubes, etc.) to measure airborne chemical concentrations. CTEH will use these handheld instruments primarily to monitor the ambient air quality at breathing zone level. Additionally, measurements may be made at grade level, as well as in elevated workspaces, as indicated by chemical properties or site conditions.
Analytical sampling	Analytical sampling may be used to validate the fixed and handheld real-time monitoring data, or to provide data beyond the scope of the real-time instruments. Analytical samples may be collected as whole air samples in evacuated canisters or on specific collection media, and sent to an off-site laboratory for further chemical analysis.
Particulate Monitoring Network	A network of data-logging particulate monitors may be set up and positioned around the Community.

Quality Assurance/Quality Control Procedures

Method	Procedure
Real-Time	• Real-time instruments may be calibrated in excess of the manufacturer's recommendations. o At a minimum whenever indicated by site conditions or instrument readings. • Co-located sampling for analytical analysis may be conducted, if necessary, to assess accuracy and precision in the field. • Lot numbers and expiration dates may be recorded with use of Gastec colorimetric tubes.
Analytical	• Chain of custody documents may be completed for each sample. • Level IV data validation may be performed on the first sample group analyzed. • Level II data validation may be performed on 100% of samples. • Level IV data validation may be performed on a minimum 10% of all samples.
Reporting	• Daily data summaries may be provided for informational purposes using data that have not undergone complete QA/QC. • These daily data summaries will be provided to Unified Command each morning. • Data may be shared with state and federal regulatory agency's at the request of the client. • Comprehensive reports of real-time and/or analytical data may be generated following QA/QC and may be delivered 60 days following receipt of validated results, if applicable.

Glossary

Term	Definition
Sustained	Instrument reading above the action level continuously for the listed time period.
Excursion Limit	Whenever a reading exceeds an ACGIH® TLV by 5 times (if the chemical does not have a STEL- or Ceiling-based action level), exit the area and notify the PM
Breathing zone	The area within an approximate 10-inch radius of an individual's nose and mouth.
Ambient Air	That portion of the atmosphere (indoor or outdoor) to which workers and the general public have access.

Change from version 1.0 to 1.1			
• *In the section titled:*			
	Name/Organization	Signature	Date Signed
Prepared by:			
Review by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			

Change from version 1.1 to 1.2			
• *In the section titled:*			
	Name/Organization	Signature	Date Signed
Prepared by:			
Review by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			

CTEH

THE SCIENCE OF READY℠

South 4 Group Fire

Port Neches, TX

Preliminary Air Sampling and Analysis Plan (SAP)

Version 1.2

Prepared on behalf of:

TPC Group

Prepared By:

CTEH, LLC

5120 Northshore Drive

North Little Rock, AR 72118

501-801-8500

December 5, 2019

	Name/Organization	Signature	Date Signed
Prepared by:	Shawn Wnek, PhD, DABT	[signature]	12/5/2019
Reviewed by:	Linda Easton, Proj. Mngr.	Linda Easton	12/5/2019
Approved by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			

– see attached signature page –

Air Monitoring and Sampling Strategy

CTEH® is focusing on the mixtures, chemicals, and indicators of flammability chosen below because they are among the most important and readily monitored hazards of light end hydrocarbons mixtures (including raffinate, 1,3-butadiene, butene) and associated combustion products. Monitoring and sampling for some chemicals or associated indicators may be conducted less frequently or even discontinued as initial air monitoring and sampling results indicate that these chemicals and indicators do not pose a health concern.

The strategy is to utilize three broadly-defined monitoring plans: 1) Worker Monitoring; 2) Community Assessment; and 3) Site Assessment. Worker Monitoring will generally take place in the presence of workers performing/supporting mitigation and remediation operations. The readings will generally be taken at a height consistent with that of the sampler's breathing zone and in close proximity to workers without interfering or obstructing their work tasks. Community Assessment may take place in those residential and commercial locations immediately surrounding the incident site, not necessarily currently occupied by members of the community. Unlike Worker Monitoring and Community Assessment, Site Assessment does not necessarily represent ambient air monitoring near breathing zone level. Site Assessment may involve a variety of different monitoring tasks intended to provide information that may help to delineate the nature and extent of the release (e.g. fence line monitoring, worst case determination, container head space, ground level, etc.).
Free-roaming handheld real-time air monitoring may be conducted in a variety of areas based on levels of activity, proximity to the release/source area, and site conditions.

Discrete air samples may be collected in all monitoring areas and sent to an off-site laboratory for chemical analysis. These analytical air sampling techniques may be used to provide air quality data beyond the scope of real-time instruments. When necessary, discrete air samples may be collected on individual workers (personal sampling) to provide exposure data over the course of a work shift for more direct comparison to occupational exposure values.

CTEH® Site-Specific Action Levels

CTEH site-specific action levels may be employed in all air monitoring plans to provide information for corrective action to limit potential exposures. These values do not replace occupational or community exposure standards or guidelines but are intended to represent a concentration limit that triggers a course of action to better address worker and public safety. Action level exceedances will be communicated to Site Management and the CTEH Project Technical Director by the CTEH Project Manager (PM). Work practices may be assessed and then altered if necessary. Site-Specific action levels are not utilized for Site Characterization monitoring.

Plan 1: Worker Monitoring
Analytes and Parameters

Objective: Report air levels before they reach those requiring respiratory protection within the fenceline of the facility and designated work areas.

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs** (as 1,3-butadiene)	0.5 ppm 5 min	Confirm reading with secondary instrument specific to 1,3-butadiene/benzene.	OSHA PEL Action Level of 0.5 ppm	MultiRAE PID AreaRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	0.6 (10.6 eV Lamp)
1,3-butadiene	0.5 ppm 5 min	Exit area or don air purifying respirator; report reading to PM. PM will report readings to site management and additional site controls may be implemented.	OSHA PEL Action Level of 0.5 ppm	Drager X-pid 8500	0.07 ppm	LOQ Range: 0.2-25 ppm	NA
				UltraRAE PID	0.1 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec #174LL	0.1 ppm	Range: 0.5-5 ppm (vol. variable)	See insert.
1,3-butadiene	5 ppm 5 min	Exit area or don air purifying respirator; report reading to PM. PM will report readings to site management and additional site controls may be implemented	OSHA -STEL (5 ppm)	Instruments as above	--	--	--
Butane	500 ppm 5 min	Monitor for oxygen deficiency and verify sustained level	½ ACGIH TLV STEL for aliphatic hydrocarbons $C_1 – C_4$	MultiRAE PID AreaRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	67 (10.6 eV Lamp)
				Gastec tube #104	5 ppm	Measuring Range: 25 - 1,400 ppm Volume: Var.	See Tube Insert
Benzene	0.5 ppm 5 min	Exit area or don air purifying respirator; report readings to PM	OSHA PEL Action level/ACGIH TLV-TWA	Drager X-pid 8500	0.02 ppm	Measuring Range: 0.02-25 ppm	NA
				UltraRAE PID	0.025 ppm	UltraRAE-Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.1-65 ppm Volume: Variable	See insert.
Benzene	5 ppm Sustained	Exit area or don air purifying respirator; move upwind; report readings to PM	OSHA STEL	Drager X-pid 8500	0.02 ppm	Measuring Range: 0.02-25 ppm	NA
				UltraRAE PID	0.025 ppm	UltraRAE-Change SEP tube frequently	NA

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
				Gastec tube #121L	0.05 ppm	Range: 0.1-65 ppm Volume: Variable	See insert.
Chlorine	0.4 ppm	Exit area or don air purifying respirator; move upwind; report readings to PM.	ACGIH STEL	Electrochemical Sensor MultiRAE/AreaRAE	0.1 ppm	Measuring Range: 0 – 50 ppm	NA
	0.5 ppm		ACGIH TLV-TWA				
	10 ppm	Exit area and move upwind, or don SCBA. Report readings to PM.	IDLH				
Styrene	2 ppm	Exit Area or don air purifying respirator; report reading to PM.	1/10 ACGIH TLV	Gastec tube #124L	0.5 ppm	Measuring Range: 2 – 25 ppm	See insert.
Oxygen	<19.5%	Exit area and move upwind, or don SCBA. Report readings to PM.	OSHA 29 CFR 1910.146 Subpart J	Electrochemical Sensor MultiRAE/AreaRAE	0.1% Vol.	Measuring Range: 0 – 30% Vol.	NA
	>23.5%	Exit area and move upwind. Report readings to PM.					

** Note that additional analytes are detectible on the MultiRAE/AreaRAE PID with the following correction factors: benzene (0.47), butadiene (0.6); 1-butene (0.9); butane (67); isobutane (2.1); isobutylene (1.0); 4-vinylcyclohexane (0.56); dicyclopentadiene (0.47); tert-butyl methyl ether ((0.9); isopentane (8.2); ethylbenzene (0.47); xylene (0.42).

Combustion By-Products: Analytes and Parameters*

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Particulate Matter ($PM_{2.5}$ or PM_{10})**	0.351 mg/m^3 5 min	Report reading to PM	Wildfire Smoke Guidelines for 1 hr avg. upper-bound breakpoint for unhealthy AQI	SidePak AM510 SidePak AM520	0.001 mg/m^3	PM2.5 impactor – 50% cut-off at 2.5 micron PM10 impactor – 50% cut-off at 10 micron	NA
$PM_{2.5}$ or PM_{10}	0.200 mg/m^3 8 hr	Report reading to PM	See above - 8 hr guideline	SidePak AM510 SidePak AM520	0.001 mg/m^3	See above	NA
Carbon monoxide (CO)	25 ppm 5 min	Report reading to PM	ACGIH* TLV – Reading sustained for 5 minutes	MultiRAE Sensor AreaRAE Sensor	1 ppm	Range: 0 – 500 ppm	NA
				Gastec tube #1LC	0.5 ppm	Range: 1 – 30 ppm Volume: 100 mL	1

Combustion By-Products: Analytes and Parameters*							
Analyte	**Action Level**	**Action to be Taken**	**Basis**	**Instrument**	**Detection Limit**	**Notes**	**Correction Factor**
Carbon Dioxide (CO_2)	5,000 ppm 5 min	Report reading to PM	ACGIH® TLV – Reading sustained for 5 minutes	MultiRAE Sensor AreaRAE Sensor	100 ppm	Range: 0 – 50,000 ppm	NA
				Gastec tube #2LC	20 ppm	Range: 100 – 2,000 ppm Volume: Var.	See insert
				Gastec tube #2LL	30 ppm	Range: 300 – 5,000 ppm Volume: Var.	See insert
Nitrogen dioxide (NO_2)	0.2 ppm 5 min	Report reading to PM	ACGIH® TLV – Reading sustained for 5 minutes	MultiRAE PID	1 ppm	Range: 1 – 5,000 ppm	16
				MultiRAE Sensor	0.1 ppm	Range: 0 – 20 ppm	NA
				Gastec tube #9L	0.1 ppm	Range: 0.5 – 125 ppm Volume: Var.	Var.

*Monitoring for combustion products will be conducted if a fire is reported during CTEH air monitoring. **$PM_{2.5}$ is especially prone to interference from high humidity, in cases of high humidity, PM_{10} impactors may be used which are not as sensitive to humidity. In general, correction factors may be used to adjust PM readings for humidity. Monitoring for combustion products may be discontinued when the fire is extinguished.

Flammability*								
Analyte	**Action Level**	**Corrected Value**	**Action to be Taken**	**Basis**	**Instrument**	**Detection Limit**	**Notes**	**Correction Factor**
%LEL	1 % 1 min	1.8 % ~2.0%	Notify PM, Facilitate communication with site contact.	Detectible LEL	MultiRAE/AreaRAE Sensor	1 %	Measuring range: 1 – 100%	1.8
%LEL	5 % 1 min	10 %	Exit area and Notify PM	10% of LEL	MultiRAE/AreaRAE Sensor	1 %	Measuring range: 1 – 100%	1.8

* LEL Action Levels based on LEL Sensor Correction Factor for 1-3 Butadiene (1.8) rounded to 2 as conservative estimate.

Plan 2: Community Monitoring

Analytes and Parameters

Objective: Report air levels before they reach those causing nuisance or health issues

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs**	0.5 ppm 5 min	Report reading to PM; Collect a 1,3-butadiene specific reading with secondary instrument.	Preliminary UC Action Level	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	0.6 (10.6 eV Lamp)
Total VOCs (UC Action Level) †	5.0 ppm Sustained	Report reading to PM; Collect a 1,3-butadiene specific reading; notify and report reading to Unified Command for Strike Team assessment	UC Action Level	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	0.6 (10.6 eV Lamp)
1,3-butadiene	Any Detect	Report reading to PM; verify with secondary instrument.	Inform PM/PTD of potential off-site issues	Drager X-pid 8500	0.07 ppm	LOQ Range: 0.2-25 ppm	NA
				UltraRAE PID	0.1 ppm	UltraRAE - Change SEP tube frequently	NA
1,3-butadiene (UC Action Level) †	0.5 ppm 5 min	Report reading to PM/PTD; notify and report reading to Unified Command for Strike Team assessment	Inform PM/PTD/UC of potential off-site issues	Gastec #174LL	0.1 ppm	Range: 0.5-5 ppm (vol. variable)	See insert.
Benzene	0.5 ppm 5 min	Report reading to PM/PTD; report reading to Incident/Unified Command	Inform PM/PTD/UC of potential off-site issues	Drager X-pid 8500	0.02 ppm	Measuring Range: 0.02-25 ppm	NA
				UltraRAE PID	0.025 ppm	UltraRAE-Change SEP tube frequently	NA
				Gastec tube #121L	0.05	Range: 0.1-65 ppm Volume: Variable	See insert.
Butane	Any Detect	Sample as requested; Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	67 (10.6 eV Lamp)
				Gastec tube #104	5 ppm	Measuring Range: 25 - 1,400 ppm Volume: Var.	See Tube Insert
Styrene	Any Detect	Report reading to PM.	Inform PM/PTD of potential off-site issues	Gastec tube #124L	0.5 ppm	Measuring Range: 2 – 25 ppm	See insert.

** Note that additional analytes are detectible on the MultiRAE PID with the following correction factors: benzene (0.47), butadiene (0.6); 1-butene (0.9); butane (67); isobutane (2.1); isobutylene (1.0); 4-vinylcyclohexane (0.56); dicyclopentadiene (0.47); tert-butyl methyl ether ((0.9); isopentane (8.2); ethylbenzene (0.47); xylene (0.42). † If action level is exceeded, members of Unified Command will be notified and members of State, Federal, and 3rd party contractors will respond to location of exceedance to collect additional verification monitoring with multiple instruments to assess air quality and evaluate the need for further action.

Combustion By-Products: Analytes and Parameters

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Particulate Matter ($PM_{2.5}$ or PM_{10})**	0.138 mg/m^3 5 min	Report reading to PM	Wildfire Smoke Guidelines for 1 hr. avg. upper-bound breakpoint for unhealthy for sensitive groups AQI	SidePak AM510 SidePak AM520	0.001 mg/m^3	PM2.5 impactor – 50% cut-off at 2.5 micron PM10 impactor – 50% cut-off at 10 micron	NA
$PM_{2.5}$ or PM_{10}	0.079 mg/m^3 8 hr	Report reading to PM	See above - 8 hr guideline	SidePak AM510 SidePak AM520	0.001 mg/m^3	See above	NA
Carbon monoxide	25 ppm 5 min	Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE Sensor	1 ppm	Range: 0 – 500 ppm	NA
				Gastec tube #1LC	0.5 ppm	Range: 1 – 30 ppm Volume: 100 mL	1
Carbon Dioxide	5,000 ppm 5 min	Report reading to PM	Inform PM/PTD of potential off-site issues. 1/6 of PAC-1 value of 30,000 ppm.	MultiRAE Sensor	100 ppm	Range: 0 – 50,000 ppm	NA
				Gastec tube #2LC	20 ppm	Range: 100 – 2,000 ppm Volume: Var.	See insert
				Gastec tube #2LL	30 ppm	Range: 300 – 5,000 ppm Volume: Var.	See insert
Nitrogen dioxide	0.2 ppm 5 min	Report reading to PM	Inform PM/PTD of potential off-site issues. >1/2 of AEGL-1 Value of 0.5 ppm.	MultiRAE PID	1 ppm	Range: 1 – 5,000 ppm	16
				MultiRAE Sensor	0.1 ppm	Range: 0 – 20 ppm	NA
				Gastec tube #9L	0.1 ppm	Range: 0.5 – 125 ppm Volume: Var.	Var.

**$PM_{2.5}$ is especially prone to interference from high humidity, in cases of high humidity, PM_{10} impactors may be used which are not as sensitive to humidity. In general, correction factors may be used to adjust PM readings for humidity. Monitoring for combustion products may be discontinued when the fire is extinguished.

Flammability*								
Analyte	Action Level	Corrected Value	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
%LEL	1 % 1 min	1.8 % ~2.0%	Notify PM, Facilitate communication with site contact.	Detectible LEL	MultiRAE Sensor	1 %	Measuring range: 1 – 100%	1.8
%LEL	5 % 1 min	10 %	Exit area and Notify PM	10% of LEL	MultiRAE Sensor	1 %	Measuring range: 1 – 100%	1.8

* LEL Action Levels based on LEL Sensor Correction Factor for 1-3 Butadiene (1.8) rounded to 2 as conservative estimate.

Plan 3: Site Assessment

Objective: Characterize nature and extent of release.

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs (as 1,3-butadiene)	NA	Report reading to PM	NA	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	0.6 (10.6 eV Lamp)
1,3-butadiene	NA	Report reading to PM	NA	Drager X-pid 8500	0.07 ppm	Range: 0.02-25 ppm	NA
				UltraRAE PID	0.1 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec #174LL	0.1 ppm	Range: 0.5-5 ppm (vol. variable)	See insert.
Butane	NA	Report reading to PM	NA	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	67 (10.6 eV Lamp)
				Gastec tube #104	5 ppm	Measuring Range: 25 - 1,400 ppm Volume: Var.	See Tube Insert
Benzene	NA	Report reading to PM	NA	Drager X-pid 8500	0.02 ppm	Measuring Range: 0.02-25 ppm	NA
				UltraRAE PID	0.025 ppm	UltraRAE-Change SEP tube frequently	NA
				Gastec tube #121L	0.05	Range: 0.1-65 ppm Volume: Variable	See insert.
Oxygen	<19.5%	Exit area and move upwind, or don SCBA. Report readings to PM.	OSHA 29 CFR 1910.146 Subpart J	Electrochemical Sensor MultiRAE/AreaRAE	0.1% Vol.	Measuring Range: 0 – 30% Vol.	NA

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
%LEL	5%	Exit area and notify PM	10% LEL	MultiRAE Sensor	1%	Measuring Range: 1-100%	Correction factor of 2.0

Potential Analytical Methods			
Analyte	**Media/Can**	**Method**	**Notes**
VOCs	MiniCans	EPA TO-15+TICs	
1,3-Butadiene	3M 3520 Badge or Assay 566	Modified NIOSH 1500/1501	
Benzene	3M 3520 Badge or Assay 566	Modified NIOSH 1500/1501	
Asbestos	PCM/TEM-Asbestos 25 mm cellulose cassette	NIOSH method 7400 (PCM) NIOSH Method 7402 (TEM)	
PAH-Profile	37PTFE 2.0/Treated Amberlite XAD-2	NIOSH Method 5506	

General Information on Procedures (Assessment Techniques) Used

Procedure	Description
Real-Time Handheld Survey	CTEH staff members may utilize handheld instruments (e.g. MultiRAEs; UltraRAEs; Drager PID, Gastec colorimetric detector tubes, etc.) to measure airborne chemical concentrations. CTEH will use these handheld instruments primarily to monitor the ambient air quality at breathing zone level. Additionally, measurements may be made at grade level, as well as in elevated workspaces, as indicated by chemical properties or site conditions.
Guardian Network	A Guardian network may be established with AreaRAEs equipped with electronic sensors, electrochemical sensors, and PIDs will be positioned at established locations around the work zone. The AreaRAEs will be telemetering instantaneous data at 15-second intervals to a computer console. MultiRAEs may also be used in the network. The data will be visible in real-time at the computer console and will be monitored 24 hours per day by CTEH personnel.
Analytical sampling	Analytical sampling may be used to validate the fixed and handheld real-time monitoring data, or to provide data beyond the scope of the real-time instruments. Analytical samples may be collected as whole air samples in evacuated canisters or on specific collection media and sent to an off-site laboratory for further chemical analysis.
Particulate Monitoring Network	A network of data-logging particulate monitors may be set up and positioned around the Community.

Quality Assurance/Quality Control Procedures

Method	Procedure
Real-Time	• Real-time instruments may be calibrated in excess of the manufacturer's recommendations. ○ At a minimum whenever indicated by site conditions or instrument readings. • Co-located sampling for analytical analysis may be conducted, if necessary, to assess accuracy and precision in the field. • Lot numbers and expiration dates may be recorded with use of Gastec colorimetric tubes.
Analytical	• Chain of custody documents may be completed for each sample. • Level IV data validation may be performed on the first sample group analyzed. • Level II data validation may be performed on 100% of samples. • Level IV data validation may be performed on a minimum 10% of all samples.
Reporting	• Daily data summaries may be provided for informational purposes using data that have not undergone complete QA/QC. • These daily data summaries will be provided to Unified Command each morning. • Data may be shared with state and federal regulatory agencies at the request of the client. • Comprehensive reports of real-time and/or analytical data may be generated following QA/QC and may be delivered 60 days following receipt of validated results, if applicable.

Glossary

Term	Definition
Sustained	Instrument reading above the action level continuously for the listed time period.
Excursion Limit	Whenever a reading exceeds an ACGIH® TLV by 5 times (if the chemical does not have a STEL- or Ceiling-based action level), exit the area and notify the PM
Breathing zone	The area within an approximate 10-inch radius of an individual's nose and mouth.
Ambient Air	That portion of the atmosphere (indoor or outdoor) to which workers and the general public have access.

Change from version 1.0 to 1.1			
• *Added oxygen and chlorine monitoring to Worker Monitoring.* • *Added AreaRAE support to Worker Monitoring.* • *Added TEM by NIOSH 7402 to asbestos analytical sampling.* • *Added Guardian network to Assessment Techniques*			
	Name/Organization	Signature	Date Signed
Prepared by:	B.J. Fogleman, ASP - CTEH	BJ Fogleman	12/1/2019
Reviewed by:	Shawn Wnek	SR Wnek	12/1/2019
Approved by:			
Approved by:			
Approved by:			
Approved by:			

Change from version 1.1 to 1.2			
• *At the request of Unified Command, added styrene to Worker and Community air monitoring.* • *Changed particulate matter concentrations from µg/m³ to mg/m³.* • *Added AM520 as particulate matter instrument.*			
	Name/Organization	Signature	Date Signed
Prepared by:	B.J. Fogleman, ASP - CTEH		12/5/2019
Review by:	Shawn Wnek		12/5/2019
Approved by:	JASON SANDERS, TPC		12/6/19
Approved by:	ADAm ADAms EPA OSC		12 06/19
Approved by:	Anallely Salinas TCEQ SOSC		12/6/19
Approved by:	Robert Grimm		12/11/19

CTEH
THE SCIENCE OF READY℠

South 4 Group Fire

Port Neches, TX

Preliminary Air Sampling and Analysis Plan (SAP)

Version 1.3

Prepared on behalf of:

TPC Group

Prepared By:

CTEH, LLC
5120 Northshore Drive
North Little Rock, AR 72118
501-801-8500

December 5, 2019

	Name/Organization	Signature	Date Signed
Prepared by:	Shawn Wnek, PhD, DABT	[signature]	12/5/2019
Reviewed by:	Linda Easton, Proj. Mngr.	Linda Easton	12/5/2019
Approved by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			

Change from version 1.2 to 1.3			
• *For asbestos analytical air sampling in the community, NIOSH Method 7402 will only be run when there is a detection for NIOSH Method 7400 above the detection limit.* • *For asbestos analytical air sampling in the work area, NIOSH Method 7402 will only be run when there is a detection for NIOSH Method 7400 above 0.05 f/cc.*			
	Name/Organization	Signature	Date Signed
Prepared by:	Andrew Henault, BS; CTEH	Andrew Henault	1/4/2020
Reviewed by:	Dana Szymkowicz, PhD; CTEH	Dana Szymkowicz	1/4/2020
Reviewed by:	Shawn Wnek, PhD, DABT; CTEH	[illegible]	1/4/2020
Approved by:	JASON SANDERS, TPC	J Sanders	1/6/2020
Approved by:	Christina Clifton, TPC	[illegible]	01/06/2020
Approved by:	TROY D. MONK	Troy D. Monk	01/06/2020

CTEH
THE SCIENCE OF READY℠

South 4 Group Fire

Port Neches, TX

Preliminary Air Sampling and Analysis Plan (SAP)

Version 1.4

Prepared on behalf of:

TPC Group

Prepared By:

CTEH, LLC
5120 Northshore Drive
North Little Rock, AR 72118
501-801-8500

December 5, 2019

	Name/Organization	Signature	Date Signed
Prepared by:	Shawn Wnek, PhD, DABT	[signature]	12/5/2019
Reviewed by:	Linda Easton, Proj. Mngr.	Linda Easton	12/5/2019
Approved by:	JASON SANDERS, TPC	[signature]	1/24/2020
Approved by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			

Air Monitoring and Sampling Strategy

CTEH® is focusing on the mixtures, chemicals, and indicators of flammability chosen below because they are among the most important and readily monitored hazards of light end hydrocarbons mixtures (including raffinate, 1,3-butadiene, butene) and associated combustion products. Monitoring and sampling for some chemicals or associated indicators may be conducted less frequently or even discontinued as initial air monitoring and sampling results indicate that these chemicals and indicators do not pose a health concern.

The strategy is to utilize three broadly-defined monitoring plans: 1) Worker Monitoring; 2) Community Assessment; and 3) Site Assessment. Worker Monitoring will generally take place in the presence of workers performing/supporting mitigation and remediation operations. The readings will generally be taken at a height consistent with that of the sampler's breathing zone and in close proximity to workers without interfering or obstructing their work tasks. Community Assessment may take place in those residential and commercial locations immediately surrounding the incident site, not necessarily currently occupied by members of the community. Unlike Worker Monitoring and Community Assessment, Site Assessment does not necessarily represent ambient air monitoring near breathing zone level. Site Assessment may involve a variety of different monitoring tasks intended to provide information that may help to delineate the nature and extent of the release (e.g. fence line monitoring, worst case determination, container head space, ground level, etc.).
Free-roaming handheld real-time air monitoring may be conducted in a variety of areas based on levels of activity, proximity to the release/source area, and site conditions.

Discrete air samples may be collected in all monitoring areas and sent to an off-site laboratory for chemical analysis. These analytical air sampling techniques may be used to provide air quality data beyond the scope of real-time instruments. When necessary, discrete air samples may be collected on individual workers (personal sampling) to provide exposure data over the course of a work shift for more direct comparison to occupational exposure values.

CTEH® Site-Specific Action Levels

CTEH site-specific action levels may be employed in all air monitoring plans to provide information for corrective action to limit potential exposures. These values do not replace occupational or community exposure standards or guidelines but are intended to represent a concentration limit that triggers a course of action to better address worker and public safety. Action level exceedances will be communicated to Site Management and the CTEH Project Technical Director by the CTEH Project Manager (PM). Work practices may be assessed and then altered if necessary. Site-Specific action levels are not utilized for Site Characterization monitoring.

Plan 1: Worker Monitoring
Analytes and Parameters

Objective: Report air levels before they reach those requiring respiratory protection within the fenceline of the facility and designated work areas.

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs** (as 1,3-butadiene)	0.5 ppm 5 min	Confirm reading with secondary instrument specific to 1,3-butadiene/benzene.	OSHA PEL Action Level of 0.5 ppm	MultiRAE PID AreaRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	0.6 (10.6 eV Lamp)
1,3-butadiene	0.5 ppm 5 min	Exit area or don air purifying respirator; report reading to PM. PM will report readings to site management and additional site controls may be implemented.	OSHA PEL Action Level of 0.5 ppm	Drager X-pid 8500	0.07 ppm	LOQ Range: 0.2-25 ppm	NA
				UltraRAE PID	0.1 ppm	UltraRAE - Change SEP tube frequently	NA
				Gastec #174LL	0.1 ppm	Range: 0.5-5 ppm (vol. variable)	See insert.
1,3-butadiene	5 ppm 5 min	Exit area or don air purifying respirator; report reading to PM. PM will report readings to site management and additional site controls may be implemented	OSHA -STEL (5 ppm)	Instruments as above	--	--	--
Butane	500 ppm 5 min	Monitor for oxygen deficiency and verify sustained level	½ ACGIH TLV STEL for aliphatic hydrocarbons $C_1 - C_4$	MultiRAE PID AreaRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	67 (10.6 eV Lamp)
				Gastec tube #104	5 ppm	Measuring Range: 25 - 1,400 ppm Volume: Var.	See Tube Insert
Benzene	0.5 ppm 5 min	Exit area or don air purifying respirator; report readings to PM	OSHA PEL Action level/ACGIH TLV-TWA	Drager X-pid 8500	0.02 ppm	Measuring Range: 0.02-25 ppm	NA
				UltraRAE PID	0.025 ppm	UltraRAE-Change SEP tube frequently	NA
				Gastec tube #121L	0.05 ppm	Range: 0.1-65 ppm Volume: Variable	See insert.
Benzene	5 ppm Sustained	Exit area or don air purifying respirator; move upwind; report readings to PM	OSHA STEL	Drager X-pid 8500	0.02 ppm	Measuring Range: 0.02-25 ppm	NA
				UltraRAE PID	0.025 ppm	UltraRAE-Change SEP tube frequently	NA

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
				Gastec tube #121L	0.05 ppm	Range: 0.1-65 ppm Volume: Variable	See insert.
Chlorine	0.4 ppm	Exit area or don air purifying respirator; move upwind; report readings to PM.	ACGIH STEL	Electrochemical Sensor MultiRAE/AreaRAE	0.1 ppm	Measuring Range: 0 – 50 ppm	NA
	0.5 ppm		ACGIH TLV-TWA				
	10 ppm	Exit area and move upwind, or don SCBA. Report readings to PM.	IDLH				
Styrene	20 ppm	Exit Area or don air purifying respirator; report reading to PM.	ACGIH TLV	Gastec tube #124L	0.5 ppm	Measuring Range: 2 – 25 ppm	See insert.
				Drager X-pid 8500	1 ppm	Range: 1-300 ppm	NA
Oxygen	<19.5%	Exit area and move upwind, or don SCBA. Report readings to PM.	OSHA 29 CFR 1910.146 Subpart J	Electrochemical Sensor MultiRAE/AreaRAE	0.1% Vol.	Measuring Range: 0 – 30% Vol.	NA
	>23.5%	Exit area and move upwind. Report readings to PM.					
Methanol	100 ppm	Report readings to PM	ACGIH TLV	Gastec tube 111LL	0.2 ppm	Range: 2-56 ppm Volume: Variable	See insert.
	200 ppm	Exit area or don air purifying respirator		ETO-A sensor - MultiRAE	2 ppm	Range: 0.5-50 ppm	0.5

** Note that additional analytes are detectible on the MultiRAE/AreaRAE PID with the following correction factors: benzene (0.47), butadiene (0.6); 1-butene (0.9); butane (67); isobutane (2.1); isobutylene (1.0); 4-vinylcyclohexane (0.56); dicyclopentadiene (0.47); tert-butyl methyl ether ((0.9); isopentane (8.2); ethylbenzene (0.47); xylene (0.42).

Combustion By-Products: Analytes and Parameters*

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Particulate Matter ($PM_{2.5}$ or PM_{10})**	0.351 mg/m^3 5 min	Report reading to PM	Wildfire Smoke Guidelines for 1 hr avg. upper-bound breakpoint for unhealthy AQI	SidePak AM510 / SidePak AM520	0.001 mg/m^3	PM2.5 impactor – 50% cut-off at 2.5 micron PM10 impactor – 50% cut-off at 10 micron	NA
$PM_{2.5}$ or PM_{10}	0.200 mg/m^3 8 hr	Report reading to PM	See above - 8 hr guideline	SidePak AM510 / SidePak AM520	0.001 mg/m^3	See above	NA
	25 ppm 5 min	Report reading to PM	ACGIH® TLV – Reading sustained for 5 minutes	MultiRAE Sensor AreaRAE Sensor	1 ppm	Range: 0 – 500 ppm	NA

Combustion By-Products: Analytes and Parameters*							
Analyte	**Action Level**	**Action to be Taken**	**Basis**	**Instrument**	**Detection Limit**	**Notes**	**Correction Factor**
Carbon monoxide (CO)				Gastec tube #1LC	0.5 ppm	Range: 1 – 30 ppm Volume: 100 mL	1
Carbon Dioxide (CO_2)	5,000 ppm 5 min	Report reading to PM	ACGIH® TLV – Reading sustained for 5 minutes	MultiRAE Sensor AreaRAE Sensor	100 ppm	Range: 0 – 50,000 ppm	NA
				Gastec tube #2LC	20 ppm	Range: 100 – 2,000 ppm Volume: Var.	See insert
				Gastec tube #2LL	30 ppm	Range: 300 – 5,000 ppm Volume: Var.	See insert
Nitrogen dioxide (NO_2)	0.2 ppm 5 min	Report reading to PM	ACGIH® TLV – Reading sustained for 5 minutes	MultiRAE PID	1 ppm	Range: 1 – 5,000 ppm	16
				MultiRAE Sensor	0.1 ppm	Range: 0 – 20 ppm	NA
				Gastec tube #9L	0.1 ppm	Range: 0.5 – 125 ppm Volume: Var.	Var.

*Monitoring for combustion products will be conducted if a fire is reported during CTEH air monitoring. **$PM_{2.5}$ is especially prone to interference from high humidity, in cases of high humidity, PM_{10} impactors may be used which are not as sensitive to humidity. In general, correction factors may be used to adjust PM readings for humidity. Monitoring for combustion products may be discontinued when the fire is extinguished.

Flammability*								
Analyte	**Action Level**	**Corrected Value**	**Action to be Taken**	**Basis**	**Instrument**	**Detection Limit**	**Notes**	**Correction Factor**
%LEL	1 % 1 min	1.8 % ~2.0%	Notify PM, Facilitate communication with site contact.	Detectible LEL	MultiRAE/AreaRAE Sensor	1 %	Measuring range: 1 – 100%	1.8
%LEL	5 % 1 min	10 %	Exit area and Notify PM	10% of LEL	MultiRAE/AreaRAE Sensor	1 %	Measuring range: 1 – 100%	1.8

* LEL Action Levels based on LEL Sensor Correction Factor for 1-3 Butadiene (1.8) rounded to 2 as conservative estimate.

Plan 2: Community Monitoring

Analytes and Parameters

Objective: Report air levels before they reach those causing nuisance or health issues

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Total VOCs**	0.5 ppm 5 min	Report reading to PM; Collect a 1,3-butadiene specific reading with secondary instrument.	Preliminary UC Action Level	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	0.6 (10.6 eV Lamp)
Total VOCs (UC Action Level) †	5.0 ppm Sustained	Report reading to PM; Collect a 1,3-butadiene specific reading; notify and report reading to Unified Command for Strike Team assessment	UC Action Level	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	0.6 (10.6 eV Lamp)
1,3-butadiene	Any Detect	Report reading to PM; verify with secondary instrument.	Inform PM/PTD of potential off-site issues	Drager X-pid 8500	0.07 ppm	LOQ Range: 0.2-25 ppm	NA
				UltraRAE PID	0.1 ppm	UltraRAE - Change SEP tube frequently	NA
1,3-butadiene (UC Action Level) †	0.5 ppm 5 min	Report reading to PM/PTD; notify and report reading to Unified Command for Strike Team assessment	Inform PM/PTD/UC of potential off-site issues	Gastec #174LL	0.1 ppm	Range: 0.5-5 ppm (vol. variable)	See insert.
Benzene	0.5 ppm 5 min	Report reading to PM/PTD; report reading to Incident/Unified Command	Inform PM/PTD/UC of potential off-site issues	Drager X-pid 8500	0.02 ppm	Measuring Range: 0.02-25 ppm	NA
				UltraRAE PID	0.025 ppm	UltraRAE-Change SEP tube frequently	NA
				Gastec tube #121L	0.05	Range: 0.1-65 ppm Volume: Variable	See insert.
Butane	Any Detect	Sample as requested; Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE PID	0.1 ppm	Measuring Range: 0 – 5,000 ppm	67 (10.6 eV Lamp)
				Gastec tube #104	5 ppm	Measuring Range: 25 - 1,400 ppm Volume: Var.	See Tube Insert

Analyte	Action Level*	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Styrene	Any Detect	Report reading to PM.	Inform PM/PTD of potential off-site issues	Gastec tube #124L	0.5 ppm	Measuring Range: 2 — 25 ppm	See insert.
				Drager X-pid 8500	1 ppm	Range: 1-300 ppm	NA
Methanol	Any detect	Report reading to PM	Inform PM/PTD of potential off-site issues	Gastec tube 111LL	0.2 ppm	Range: 2-56 ppm Volume: Variable	See insert.
				ETO-A sensor - MultiRAE	2 ppm	Range: 0.5-50 ppm	0.5

** Note that additional analytes are detectible on the MultiRAE PID with the following correction factors: benzene (0.47), butadiene (0.6); 1-butene (0.9); butane (67); isobutane (2.1); isobutylene (1.0); 4-vinylcyclohexane (0.56); dicyclopentadiene (0.47); tert-butyl methyl ether ((0.9); isopentane (8.2); ethylbenzene (0.47); xylene (0.42). † If action level is exceeded, members of Unified Command will be notified and members of State, Federal, and 3rd party contractors will respond to location of exceedance to collect additional verification monitoring with multiple instruments to assess air quality and evaluate the need for further action.

Combustion By-Products: Analytes and Parameters

Analyte	Action Level	Action to be Taken	Basis	Instrument	Detection Limit	Notes	Correction Factor
Particulate Matter ($PM_{2.5}$ or PM_{10})**	0.138 mg/m^3 5 min	Report reading to PM	Wildfire Smoke Guidelines for 1 hr. avg. upper-bound breakpoint for unhealthy for sensitive groups AQI	SidePak AM510	0.001 mg/m^3	PM2.5 impactor – 50% cut-off at 2.5 micron PM10 impactor – 50% cut-off at 10 micron	NA
				SidePak AM520			
$PM_{2.5}$ or PM_{10}	0.079 mg/m^3 8 hr	Report reading to PM	See above - 8 hr guideline	SidePak AM510	0.001 mg/m^3	See above	NA
				SidePak AM520			
Carbon monoxide	25 ppm 5 min	Report reading to PM	Inform PM/PTD of potential off-site issues	MultiRAE Sensor	1 ppm	Range: 0 – 500 ppm	NA
				Gastec tube #1LC	0.5 ppm	Range: 1 – 30 ppm Volume: 100 mL	1

Appendix B

Air Monitoring and Sampling Reduction Plans

SOUTH 4 GROUP FIRE

Port Neches, TX

Preliminary Data Summary for the Reduction of Air Monitoring and Sampling Activities

December 9, 2019

Project #112312

	Name/Organization	Signature	Date Signed
Prepared by:	SHAWN WNEK, PHD, DABT CTEH	[signature]	12/11/2019
Reviewed by:			
Approved by:	JASON SANDERS, TPC	[signature]	12/11/19
Approved by:	ADAM ADAMS EPA OSC	[signature]	12/11/19
Approved by:	Hope Davila SOSC	Hope Davila	12/11/19
Approved by:	Robert Grimm DEMC	[signature]	12/11/19

1.0 Introduction

On November 27, 2019 at approximately 04:00 Central Standard Time (CST), TPC Group requested that CTEH® provide air monitoring and analytical air sampling support in response to an incident at the TPC Group facility located in Port Neches, Texas. CTEH® arrived on-site on November 27, 2019 at 08:00 CST and began real-time air monitoring and deploying analytical air sampling within the industrial areas and residential communities located around the TPC Facility.

Since approximately 10:00 CST on November 27, 2019, CTEH® has conducted continuous real-time air monitoring and analytical air sampling within the industrial areas and residential communities located around the TPC Port Neches facility at a radius of up to 4 miles. This report summarizes the real-time air monitoring and analytical air sampling data collected outside of the 1-mile radius around the incident since November 27th, 2019. This report will be used to support the Unified Command (UC)-approved reduction of real-time air monitoring and analytical air sampling throughout the extended community and focus air monitoring and sampling efforts within the 1-mile radius of the TPC Group facility. The last exceedance of the UC-approved 1,3-butadiene action level outside of the 1-mile radius from the incident was observed on December 6, 2019 prior to 03:00 CST.

2.0 Air Monitoring Methods

CTEH® developed and implemented an Air Sampling Analysis Plan (SAP) to document and quantify the potential release of fugitive emissions from the incident at ground level. The SAP has been approved by local, state, and federal representatives of the on-site UC. In accordance with the SAP, sustained 1,3-butadiene detections of 0.5 ppm or greater and volatile organic compound (VOC) detections of 5.0 ppm or greater in the community are to be communicated to the Federal On-Scene Coordinator.

Real-time air monitoring was conducted for 1,3-butadiene, benzene, carbon monoxide (CO), carbon dioxide (CO_2), fine-sized particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), styrene, volatile organic compounds (VOCs), and atmospheric flammability measured as the percentage of the lower explosive limit (%LEL). Real-time air monitoring was conducted using handheld instruments including Drager X-PID 8500, MultiRAEs, UltraRAEs, Gastec GV-100 handheld piston pumps (with colorimetric tubes), and TSI SidePak™ AM510/AM520 Aerosol Monitors. All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Target analytes were measured as listed in **Table 1** below. Roaming air monitoring was performed in with handheld instruments. All handheld air monitoring was conducted in the breathing zone.

3.0 Air Monitoring Results

As of December 9, 2019, over 60,000 real-time air monitoring readings have been taken throughout the community since the beginning of the response. Maps of the site location and real-time air monitoring locations outside of the 1-mile from the incident are provided in **Attachment A**. Table 1 summarizes the real-time air monitoring results collected outside of the 1-mile radius from the TPC Group facility location.

Table 1: Community Handheld Real-Time Air Monitoring Results (Outside of 1.0 mile Radius)

Analyte	Instrument	# of Readings	# of Detections	Range*
1,3-Butadiene	Drager X-PID 8500	3,812	57	0.07 – 1.00 ppm‡
	Gastec #174LL	6	3	0.2 – 1.0 ppm‡
	UltraRAE	10,733	146	0.01 - 2.80 ppm‡
Benzene	Drager X-PID 8500	2,251	0	< 0.02 ppm
	UltraRAE	63	0	< 0.01 ppm
Carbon Monoxide (CO)	MultiRAE	2,001	1	2 ppm
Carbon Dioxide (CO_2)	MultiRAE	11	11	350 - 450 ppm†
%LEL	MultiRAE	9,307	0	< 1 %
Nitrogen Dioxide (NO_2)	Gastec #2LC	180	0	< 0.1 ppm
	MultiRAE	690	0	< 0.1 ppm
Particulate Matter ($PM_{2.5}$)	AM510	2,794	2794	0.001 - 0.612 mg/m^3
	AM520	305	305	0.002 - 0.134 mg/m^3
Styrene	Drager X-PID 8500	1	0	< 1 ppm
	Gastec #124L	43	0	< 0.5 ppm
VOCs†	MultiRAE	14,871	187	0.1 - 2.6 ppm

* If no detection was observed, the instrument detection limit preceded by a "<" symbol is listed. These data have not undergone QAQC and should be considered preliminary at this time. †Volatile organic compounds. †Level of CO_2 are typical of ambient conditions. ‡These readings were observed prior to December 6, 2019

Since November 27, 2019 09:33 CST, CTEH has observed 237 exceedances of the UC-approved action level for 1,3-butadiene (0.5 ppm) outside of the 1-mile radius from the incident. The last exceedance of the UC-approved 1,3-butadiene action level outside of the 1-mile radius from the incident was observed on December 6, 2019 prior to 03:00 CST.

Since November 27, 2019 09:33 CST, CTEH has observed 12 exceedances of the VOCs action level outside of the one-mile radius from the incident. The last exceedance of the UC-approved VOC action level outside of the one-mile radius from the incident was observed on December 4, 2019 at 20:51 CST.

A list of all readings above the UC-approved action level of 0.5 ppm for 1,3-butadiene and 5.0 ppm for VOCs recorded outside of the one-mile radius is included in **Attachment B**.

4.0 Air Sampling Methods

CTEH® collected air samples in the surrounding community areas for laboratory analysis of airborne volatile organic compound (VOC), polycyclic aromatic hydrocarbon (PAH), and asbestos. Maps of the site location and analytical air sample locations are provided in **Attachment C**. Whole air samples for VOCs were collected using 1.4-liter evacuated canisters with a 24-hour flow controller. These samples were deployed for 24-hour periods and sent to a third-party accredited laboratory for analysis of volatile organic compounds (VOCs)[1], including 1,3-butadiene, in accordance with the United States Environmental Protection Agency (US EPA) method TO-15. In addition, air samples were collected over 24-hour periods using sampling air pumps with chemical-specific sorbent media and were analyzed for PAHs according to the NIOSH Method 5506. Integrated air sampling was also conducted to document and quantify the potential presence of airborne asbestos fibers (if any). All asbestos samples were sent to an American Industrial Hygiene Association (AIHA)-accredited laboratory for analysis by NIOSH method 7400 phase contrast microscopy (PCM) and NIOSH method 7402 transmission electron microscopy (TEM). In addition, to ensure completeness, each laboratory report is also undergoing data verification and/or validation by an independent contractor.

5.0 Air Sampling Results

A summary of VOC detections for the chemicals of interest from samples collected outside of the 1-mile radius is provided in **Table 2**. A summary of analytical sampling results for PAHs and asbestos are provided in **Table 3** and **Table 4**, respectively. A table of all analytical results available to date is provided in **Appendix D, E,** and **F.**

Table 2: Summary of VOC Analytical Air Sample Results Outside of the 1-mile Radius

Analyte	Count of Samples	Count of Detections	Average of Detections	Detection Range
1,2,4-Trimethylbenzene	127	82	0.125 ppbv	0.0601 – 0.363 ppbv
1,3-Butadiene	127	74	13.689 ppbv	0.0603 – 267 ppbv
Benzene	127	114	0.499 ppbv	0.0728 – 6.16 ppbv
Butane	127	112	6.059 ppbv	0.602 – 57 ppbv
Ethylbenzene	127	60	0.134 ppbv	0.0603 – 0.411 ppbv
MTBE	127	24	0.376 ppbv	0.0645 – 1.83 ppbv
Naphthalene	127	24	1.162 ppbv	0.191 – 10.2 ppbv

[1] Analysis also includes tentative identified compounds (TICs).

M&p-Xylene	127	96	0.319 ppbv	0.0948 – 1.73 ppbv
o-Xylene	127	79	0.156 ppbv	0.0634 – 0.705 ppbv

Since the beginning of the response, more than 200 analytical air samples have analyzed for PAHs. Table 3 summarizes the PAH results for the samples collected outside of the 1-mile radius from the TPC facility.

Table 3: Summary of PAH Analytical Air Sample Results Outside the 1-Mile Radius*

Analyte	Count of Samples	Count of Detections	Detection Range (ug)
Acenaphthylene	40	0	< 0.62
Anthracene	40	0	< 0.62
Benzo(a)anthracene	40	0	< 0.31
Benzo(a)pyrene	40	0	< 0.31
Benzo(b)fluoranthene	40	0	< 0.31
Benzo(e)pyrene	40	0	< 0.31
Benzo(g,h,i)perylene	40	0	< 0.31
Benzo(k)fluoranthene	40	0	< 0.31
Chrysene	40	0	< 0.31
Dibenzo(a,h)anthracene	40	0	< 0.31
Fluoranthene	40	0	< 0.31
Fluorene	40	0	< 0.62
Indeno(1,2,3-c,d)pyrene	40	0	< 0.31
Naphthalene	40	0	< 0.62
Phenanthrene	40	0	< 0.31
Pyrene	40	0	< 0.31

*These data have not undergone complete Level II verification.

Since the beginning of the response, a total of 322 analytical air samples have collected for asbestos analytis and a total of 168 analytical air samples have been analyzed via NIOSH method 7402 transmission electron microscopy (TEM).

Table 4: Summary of Abestos Analytical Air Sample Results Collected Outside the 1-mile Radius*

Analytical Method	Analyte	Count of Lab Results	Count of Detections	Range of Detections
NIOSH 7402 (TEM)	Asbestos Fibers	168	0	< 0.0055 f/cc

*These data have not undergone complete Level II verification.

6.0 Air monitoring and sampling strategy within the 1-mile radius of the TPC Group facility

Following a reduction in the geographic extent to air monitoring and sampling activities; CTEH will focus air monitoring and sampling activities within the 1-mile radius of the TPC Group facility.

CTEH will continue to conduct air monitoring and sampling activities 24-hours per day within the 1-mile radius of the TPC Group facility.

CTEH will continue to collect analytical air samples for VOCs and asbestos. Due to the absence of fire smoke particulate, CTEH will discontinue analytical air sampling for PAHs as results collected during the initial fire indicated non-detectable levels of PAHs.

CTEH will discontinue air monitoring for combustions by-products including carbon monoxide (CO), fine particulate (PM2.5), nitrogen dioxide (NO2), and carbon dioxide (CO2). In the event of a significant fire, monitoring for these analytes will be re-initiated.

CTEH may re-evaluate the location of analytical air sampling locations within the 1-mile radius to meet 360-degrees of coverage.

CTEH will conduct air monitoring assessment of nearby schools prior to the beginning of class each morning or as requested by the district.

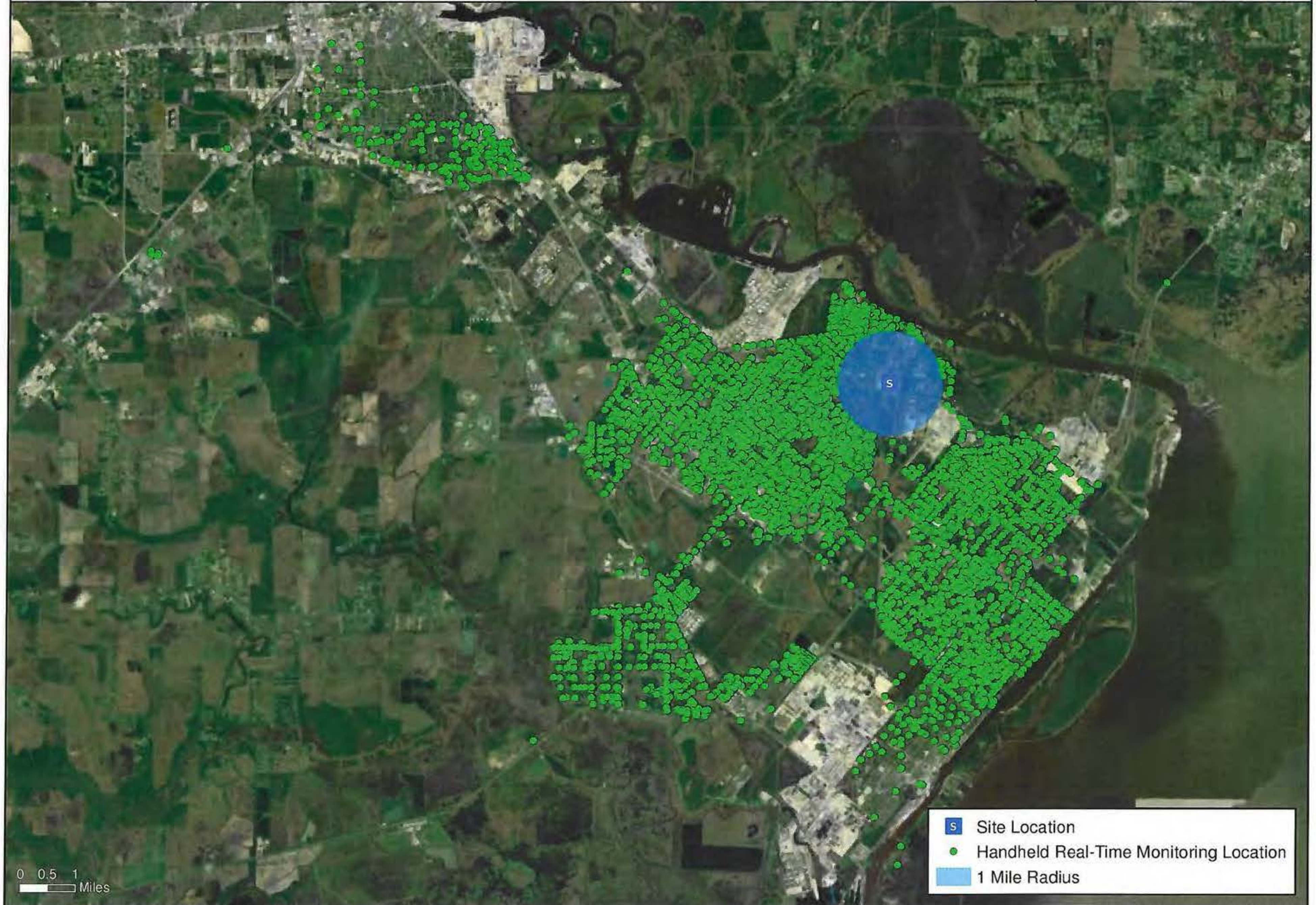
Attachment A

Map of Incident Location and Preliminary Real Time Monitoring Locations

Handheld Real-Time Community Monitoring Locations (Within 1 Mile Excluded)

South 4 Group Fire I Port Neches, TX | 11/27/2019 9:33 - 12/8/2019 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



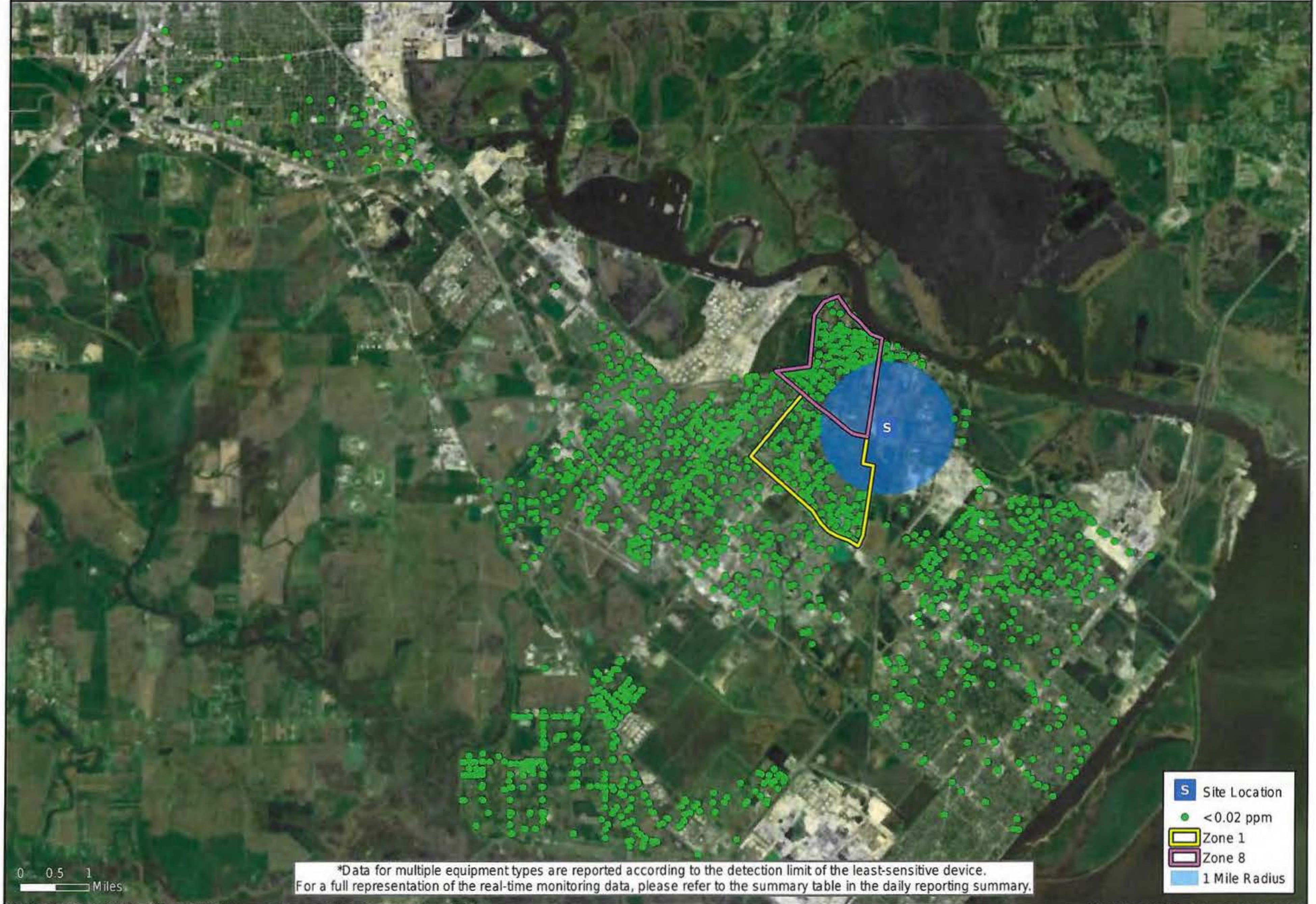
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* DATUM: *North American 1983* LAST UPDATED: *12/9/2019 4:55:50 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (Benzene)

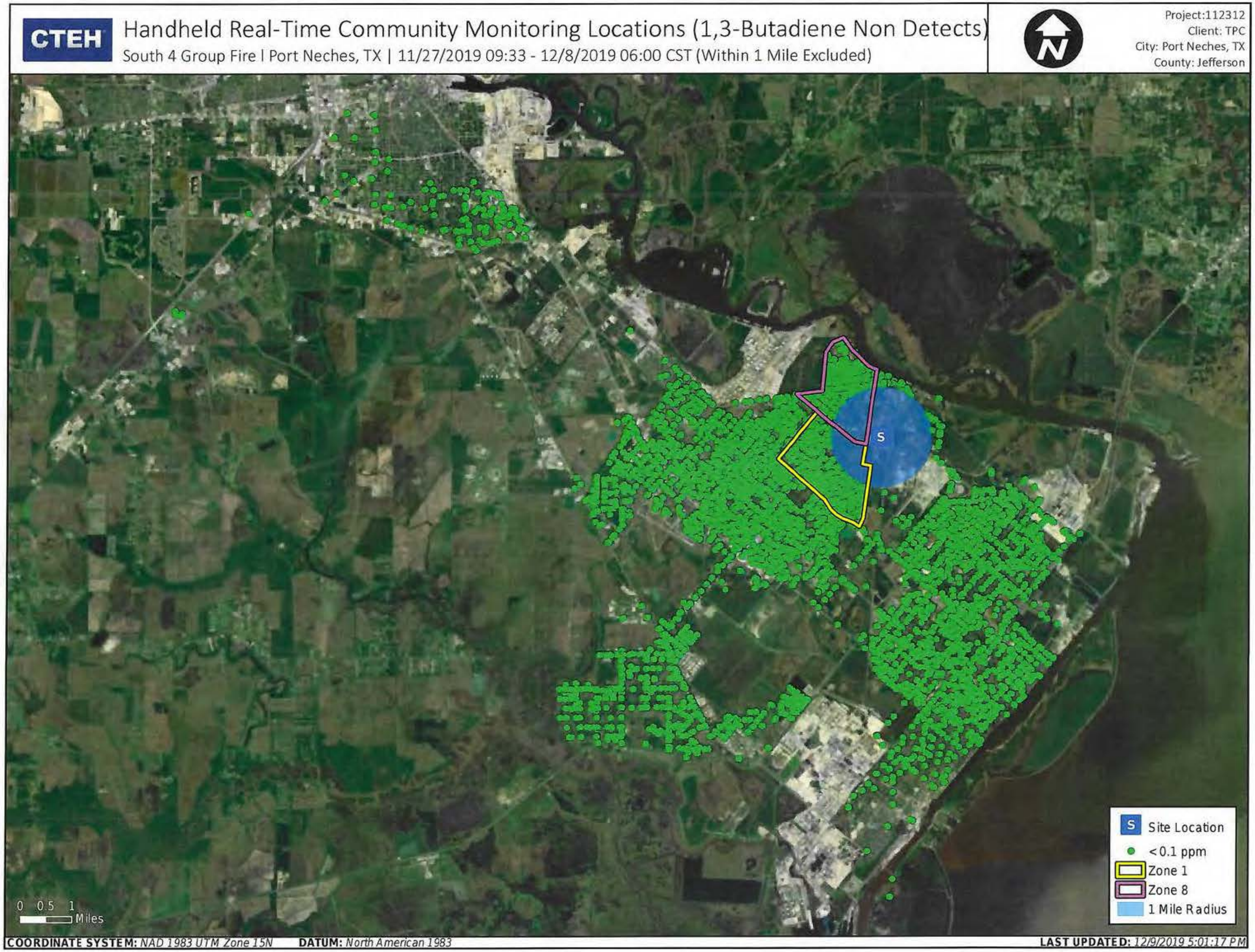
South 4 Group Fire I Port Neches, TX | 11/27/2019 9:33 - 12/8/2019 06:00 CST (Within 1 Mile Excluded)

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



*Data for multiple equipment types are reported according to the detection limit of the least-sensitive device.
For a full representation of the real-time monitoring data, please refer to the summary table in the daily reporting summary.

COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *12/9/2019 4:57:26 PM*

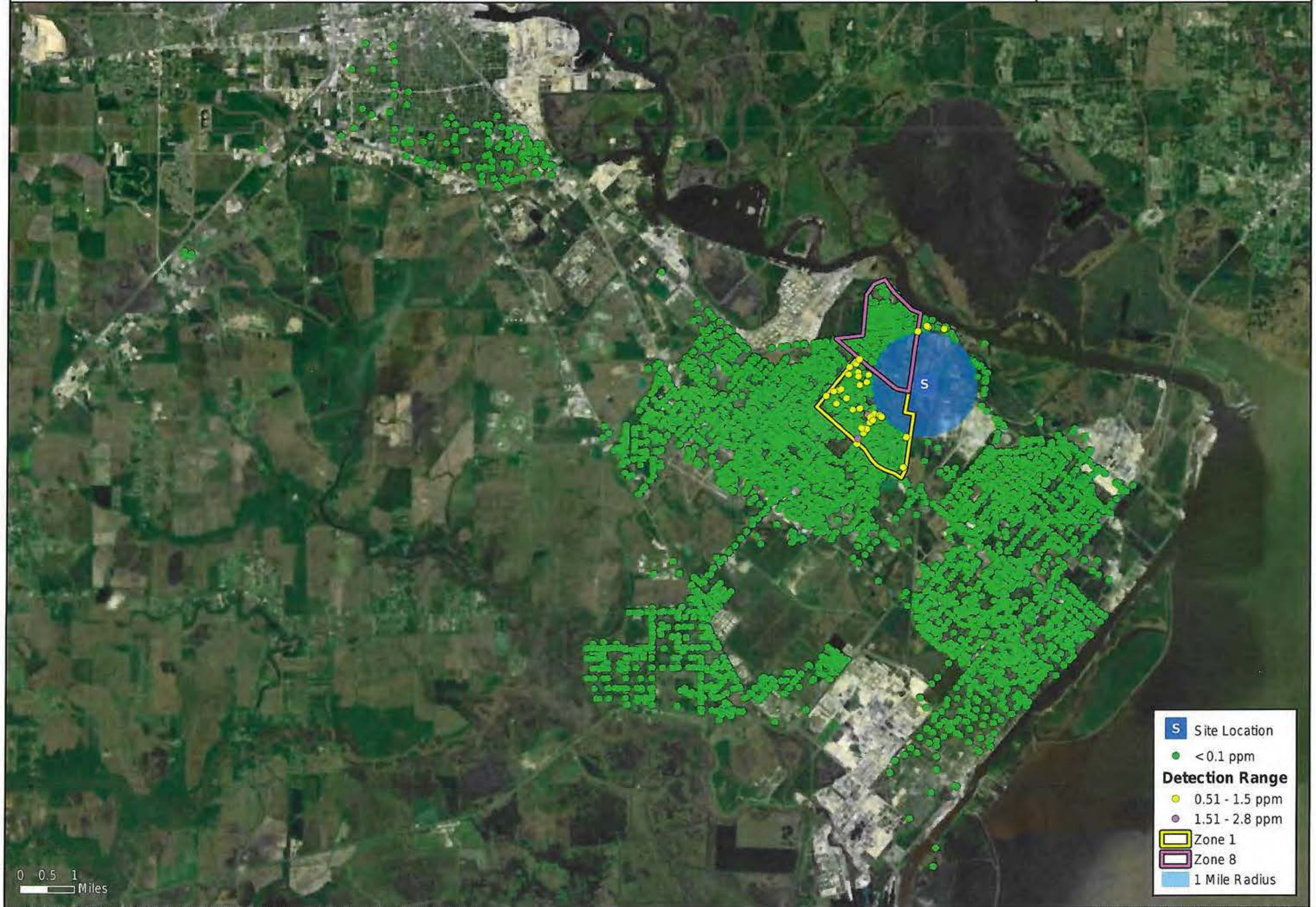

CTEH
Handheld Real-Time Community Monitoring Locations (1,3-Butadiene Non Detects)
South 4 Group Fire I Port Neches, TX | 11/27/2019 09:33 - 12/8/2019 06:00 CST (Within 1 Mile Excluded)
N
Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson
S
Site Location
< 0.1 ppm
Zone 1
Zone 8
1 Mile Radius
0 0.5 1
Miles
COORDINATE SYSTEM: NAD 1983 UTM Zone 15N
DATUM: North American 1983
LAST UPDATED: 12/9/2019 5:01:17 PM

CTEH

Handheld Real-Time Community Monitoring Locations (1,3-Butadiene)

South 4 Group Fire I Port Neches, TX | 11/27/2019 09:33 - 12/8/2019 06:00 CST (Within 1 Mile Excluded)

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

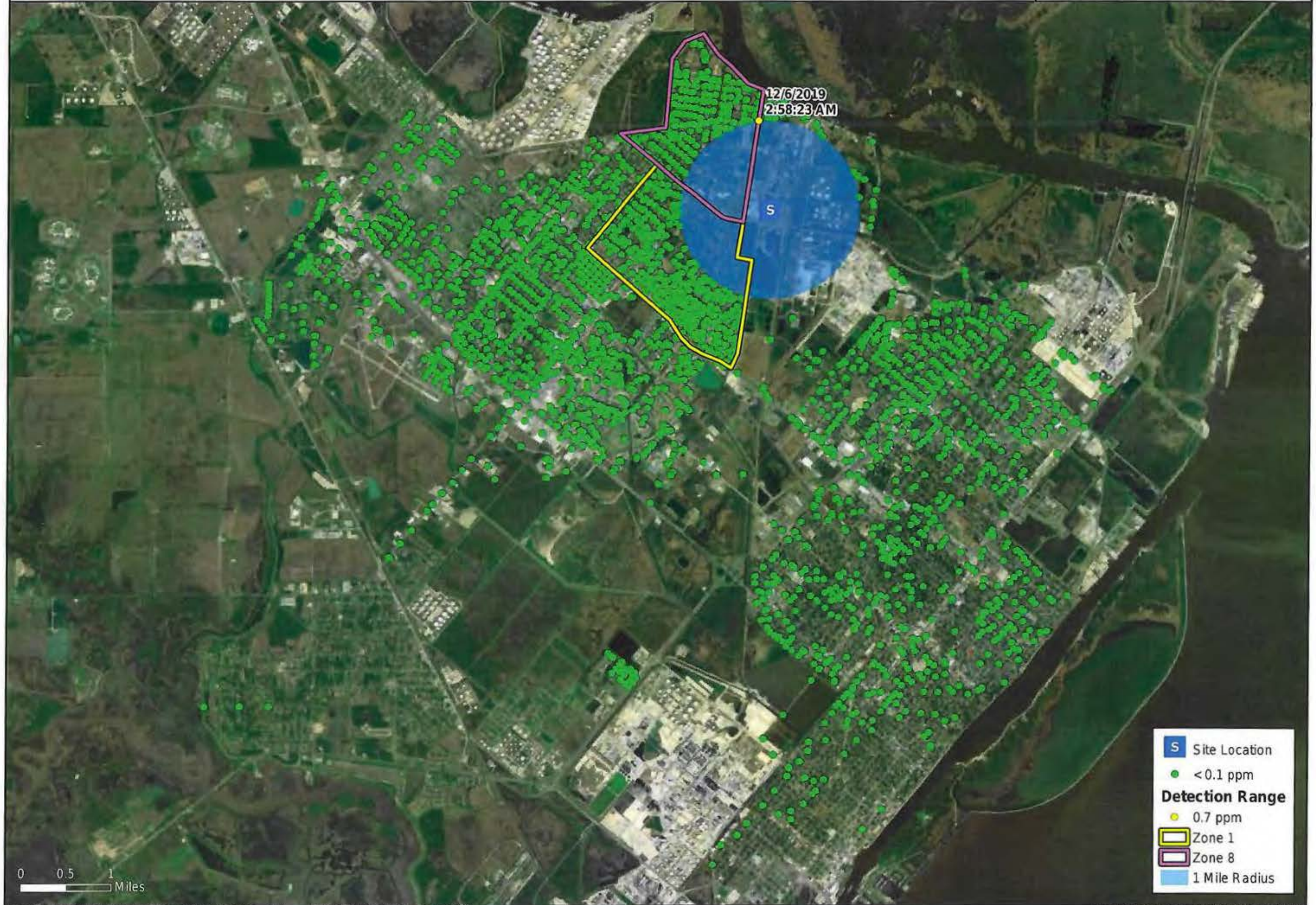


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* DATUM: *North American 1983* LAST UPDATED: *12/9/2019 5:12:35 PM*

Handheld Real-Time Community Monitoring Locations (1,3-Butadiene)

South 4 Group Fire I Port Neches, TX | 12/5/2019 12:00 - 12/8/2019 06:00 CST (Within 1 Mile Excluded)

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: NAD 1983 UTM Zone 15N DATUM: North American 1983 LAST UPDATED: 12/9/2019 5:21:36 PM

Handheld Real-Time Community Monitoring Locations (Carbon Monoxide)

South 4 Group Fire I Port Neches, TX | 11/27/2019 09:33 - 12/8/2019 06:00 CST (Within 1 Mile Excluded)

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *12/9/2019 5:17:17 PM*

Handheld Real-Time Community Monitoring Locations (Carbon Dioxide)

South 4 Group Fire | Port Neches, TX | 11/27/2019 09:33 - 12/8/2019 06:00 CDT (Within 1 Mile Excluded)

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

COORDINATE SYSTEM: NAD 1983 UTM Zone 15N DATUM: North American 1983

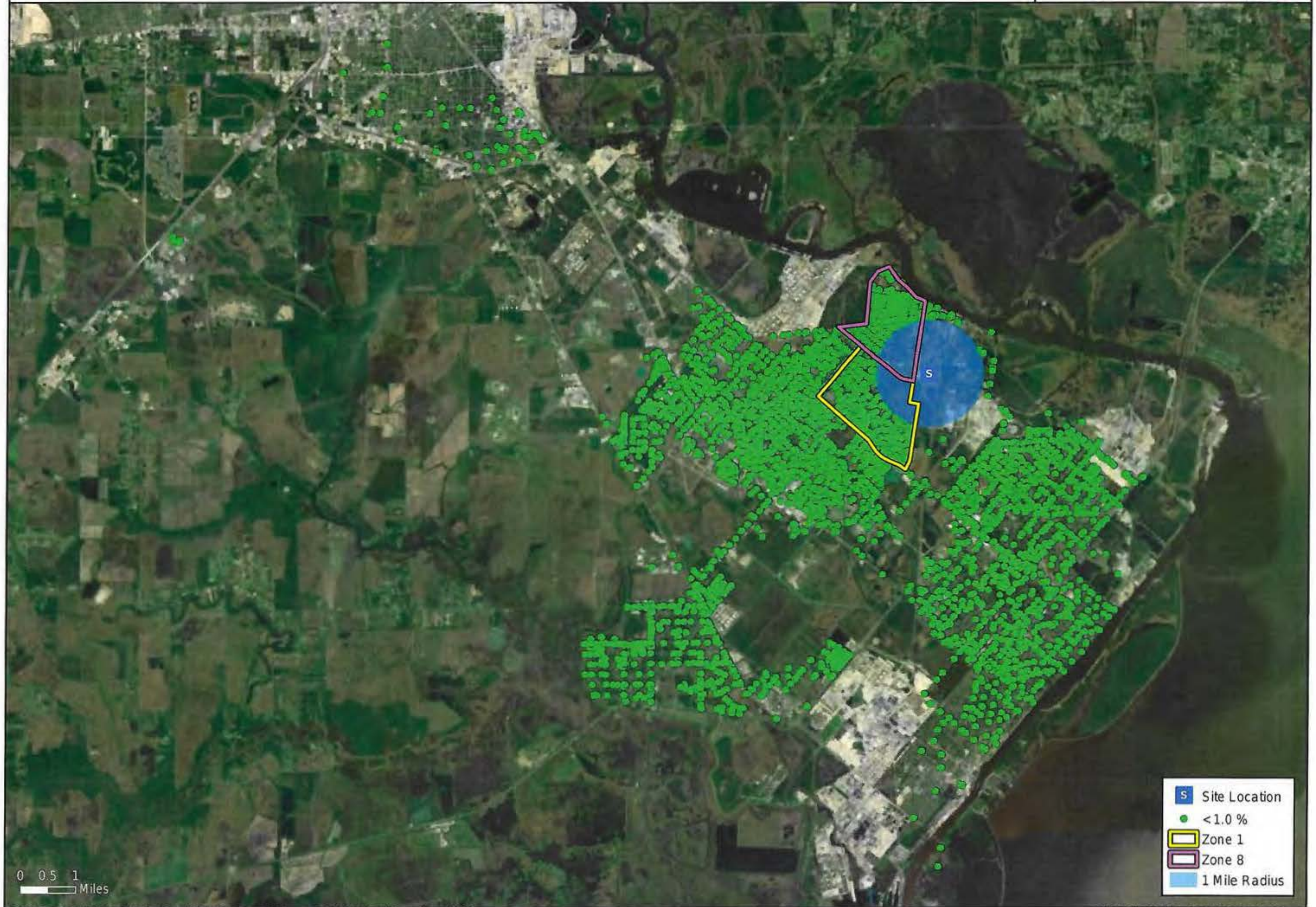
LAST UPDATED: 12/9/2019 5:18:13 PM

CTEH

Handheld Real-Time Community Monitoring Locations (%LEL)

South 4 Group Fire I Port Neches, TX | 11/27/2019 09:33 - 12/8/2019 06:00 CST (Within 1 Mile Excluded)

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *12/9/2019 5:19:08 PM*

CTEH

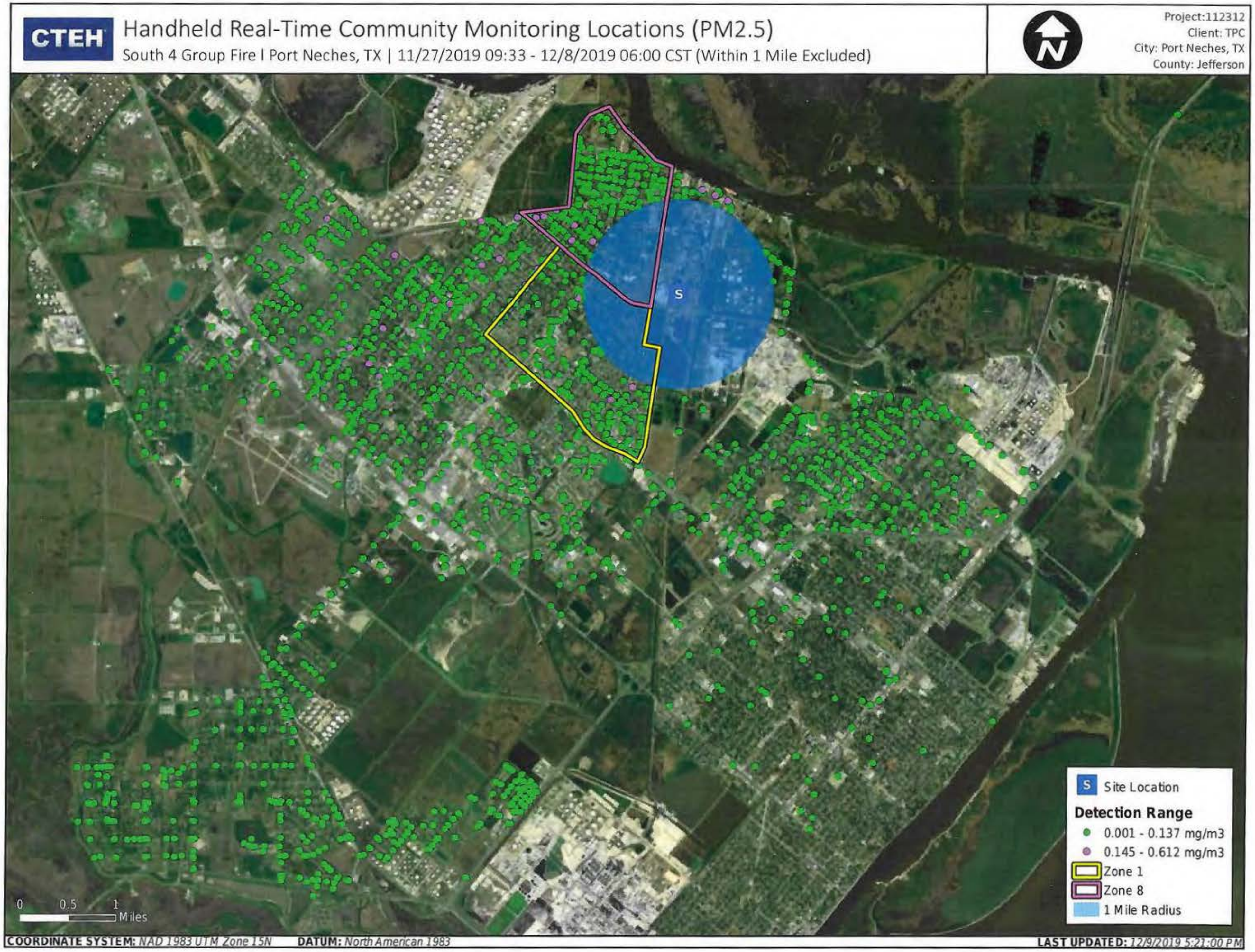
Handheld Real-Time Community Monitoring Locations (NO2)

South 4 Group Fire | Port Neches, TX | 11/27/2019 09:33 - 12/8/2019 06:00 CST (Within 1 Mile Excluded)

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

COORDINATE SYSTEM: NAD 1983 UTM Zone 15N DATUM: North American 1983

LAST UPDATED: 12/9/2019 5:20:03 PM

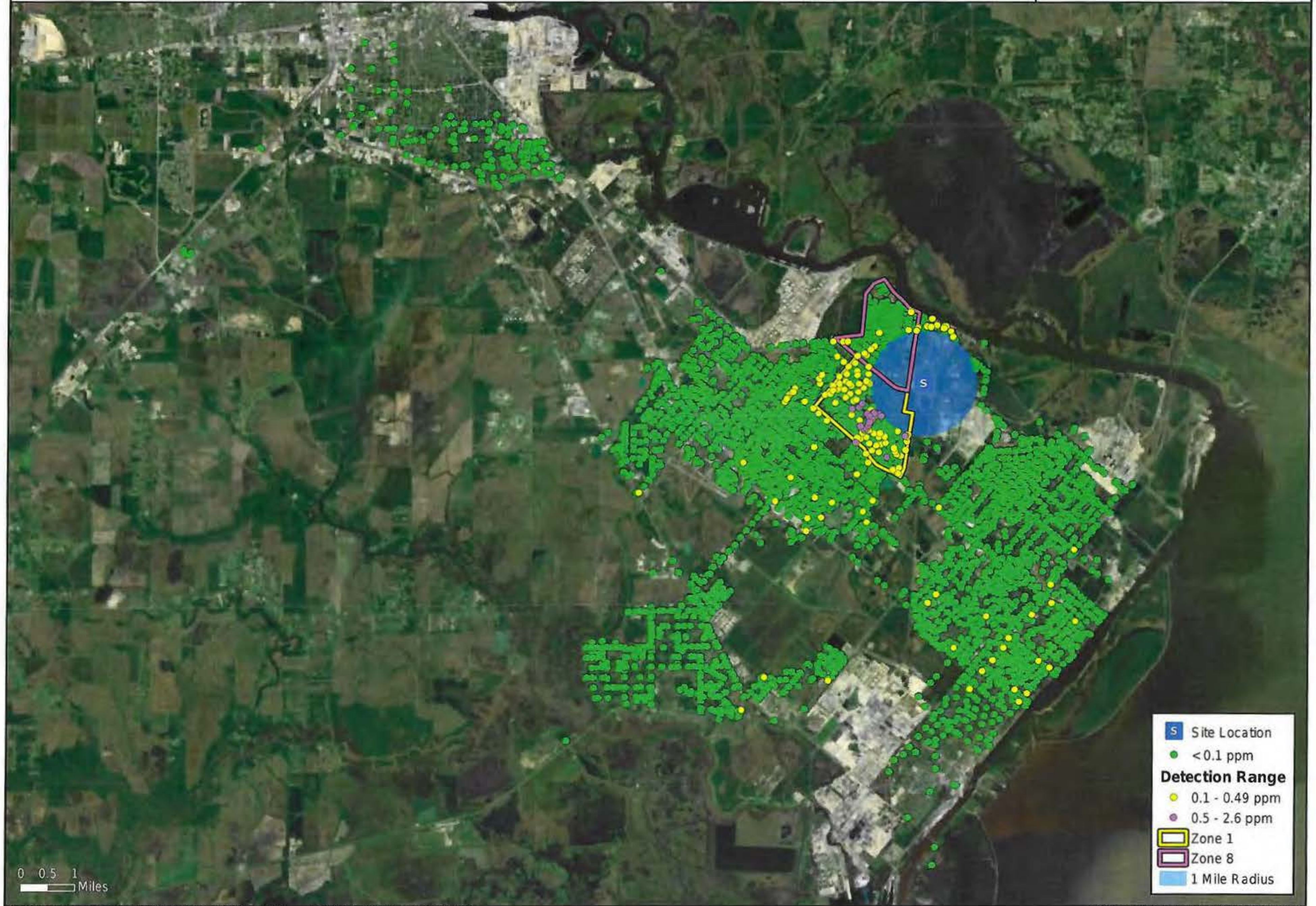

CTEH
Handheld Real-Time Community Monitoring Locations (PM2.5)
South 4 Group Fire I Port Neches, TX | 11/27/2019 09:33 - 12/8/2019 06:00 CST (Within 1 Mile Excluded)
N
Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson
S
S Site Location
Detection Range
0.001 - 0.137 mg/m3
0.145 - 0.612 mg/m3
Zone 1
Zone 8
1 Mile Radius
0 0.5 1 Miles
COORDINATE SYSTEM: NAD 1983 UTM Zone 15N
DATUM: North American 1983
LAST UPDATED: 12/9/2019 5:21:00 PM

CTEH

Handheld Real-Time Community Monitoring Locations (VOCs)

South 4 Group Fire I Port Neches, TX | 11/27/2019 09:33 - 12/8/2019 06:00 CST (Within 1 Mile Excluded)

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* DATUM: *North American 1983*

LAST UPDATED: *12/9/2019 5:22:48 PM*

Handheld Real-Time Community Monitoring Locations (VOCs)

South 4 Group Fire I Port Neches, TX | 12/5/2019 12:00 - 12/8/2019 06:00 CST (Within 1 Mile Excluded)

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

COORDINATE SYSTEM: NAD 1983 UTM Zone 15N DATUM: North American 1983 LAST UPDATED: 12/9/2019 5:27:01 PM

Attachment B

List of UC-Approved Action Level Exceedances for 1,3-butadiene and VOCs

Reading Date	Analyte	Concentration
12/6/2019 2:58	1,3-Butadiene	0.7
12/6/2019 2:32	1,3-Butadiene	0.51
12/5/2019 9:17	1,3-Butadiene	0.55
12/5/2019 9:15	1,3-Butadiene	0.78
12/5/2019 8:59	1,3-Butadiene	0.59
12/5/2019 8:33	1,3-Butadiene	1
12/5/2019 8:22	1,3-Butadiene	2.28
12/5/2019 8:19	1,3-Butadiene	5.08
12/5/2019 8:14	1,3-Butadiene	5.21
12/5/2019 7:59	1,3-Butadiene	1.24
12/5/2019 7:57	1,3-Butadiene	1.23
12/5/2019 7:50	1,3-Butadiene	1.3
12/5/2019 7:41	1,3-Butadiene	0.58
12/5/2019 7:39	1,3-Butadiene	1.38
12/5/2019 7:33	1,3-Butadiene	0.59
12/5/2019 7:31	1,3-Butadiene	0.56
12/5/2019 7:28	1,3-Butadiene	1.04
12/5/2019 6:44	1,3-Butadiene	1.6
12/5/2019 6:33	1,3-Butadiene	1
12/5/2019 5:35	1,3-Butadiene	0.67
12/5/2019 5:28	1,3-Butadiene	1.4
12/5/2019 5:06	1,3-Butadiene	1.89
12/5/2019 5:01	1,3-Butadiene	0.5
12/5/2019 4:46	1,3-Butadiene	0.91
12/5/2019 4:33	1,3-Butadiene	0.6
12/5/2019 4:20	1,3-Butadiene	1.98
12/5/2019 4:19	1,3-Butadiene	1.34
12/5/2019 4:18	1,3-Butadiene	0.88
12/5/2019 4:10	1,3-Butadiene	0.6
12/5/2019 3:54	1,3-Butadiene	1.28
12/5/2019 3:50	1,3-Butadiene	0.79
12/5/2019 3:48	1,3-Butadiene	0.94
12/5/2019 3:43	1,3-Butadiene	0.86
12/5/2019 3:41	1,3-Butadiene	0.79
12/5/2019 3:36	1,3-Butadiene	0.9
12/5/2019 3:33	1,3-Butadiene	0.64
12/5/2019 3:28	1,3-Butadiene	0.56
12/5/2019 3:13	1,3-Butadiene	0.65
12/5/2019 2:59	1,3-Butadiene	1.28
12/5/2019 2:56	1,3-Butadiene	1.01
12/5/2019 2:51	1,3-Butadiene	0.75
12/5/2019 2:49	1,3-Butadiene	1.07
12/5/2019 2:47	1,3-Butadiene	1.6
12/5/2019 2:44	1,3-Butadiene	0.57
12/5/2019 2:43	1,3-Butadiene	0.89
12/5/2019 2:39	1,3-Butadiene	1.11

12/5/2019 2:17	1,3-Butadiene	0.51
12/5/2019 1:53	1,3-Butadiene	0.9
12/5/2019 1:48	1,3-Butadiene	2
12/5/2019 1:43	1,3-Butadiene	2.45
12/5/2019 1:42	1,3-Butadiene	0.57
12/5/2019 1:39	1,3-Butadiene	0.52
12/5/2019 1:38	1,3-Butadiene	0.74
12/5/2019 1:36	1,3-Butadiene	2.3
12/5/2019 1:31	1,3-Butadiene	0.52
12/5/2019 1:30	1,3-Butadiene	1.94
12/5/2019 1:25	1,3-Butadiene	0.93
12/5/2019 1:20	1,3-Butadiene	0.75
12/5/2019 1:17	1,3-Butadiene	1.1
12/5/2019 1:15	1,3-Butadiene	0.61
12/5/2019 1:10	1,3-Butadiene	0.99
12/5/2019 1:10	1,3-Butadiene	0.92
12/5/2019 1:08	1,3-Butadiene	2.52
12/5/2019 1:06	1,3-Butadiene	1.45
12/5/2019 1:01	1,3-Butadiene	2.65
12/5/2019 1:00	1,3-Butadiene	3.05
12/5/2019 1:00	1,3-Butadiene	0.94
12/5/2019 1:00	1,3-Butadiene	0.55
12/5/2019 0:59	1,3-Butadiene	0.72
12/5/2019 0:59	1,3-Butadiene	1.15
12/5/2019 0:56	1,3-Butadiene	2.75
12/5/2019 0:53	1,3-Butadiene	2.52
12/5/2019 0:52	1,3-Butadiene	3.25
12/5/2019 0:49	1,3-Butadiene	2.8
12/5/2019 0:47	1,3-Butadiene	2.06
12/5/2019 0:46	1,3-Butadiene	1.48
12/5/2019 0:41	1,3-Butadiene	1.61
12/5/2019 0:34	1,3-Butadiene	0.85
12/5/2019 0:30	1,3-Butadiene	0.53
12/5/2019 0:28	1,3-Butadiene	0.66
12/4/2019 23:58	1,3-Butadiene	0.65
12/4/2019 23:52	1,3-Butadiene	0.99
12/4/2019 23:47	1,3-Butadiene	0.76
12/4/2019 23:35	1,3-Butadiene	0.52
12/4/2019 23:31	1,3-Butadiene	0.86
12/4/2019 23:26	1,3-Butadiene	0.77
12/4/2019 23:03	1,3-Butadiene	0.69
12/4/2019 22:57	1,3-Butadiene	0.84
12/4/2019 22:44	1,3-Butadiene	0.65
12/4/2019 22:27	1,3-Butadiene	1.29
12/4/2019 22:18	1,3-Butadiene	1.7
12/4/2019 21:57	1,3-Butadiene	2.74
12/4/2019 21:56	1,3-Butadiene	0.63

12/4/2019 21:32	1,3-Butadiene	0.8
12/4/2019 21:27	1,3-Butadiene	0.7
12/4/2019 21:25	1,3-Butadiene	2.9
12/4/2019 21:21	1,3-Butadiene	0.85
12/4/2019 21:20	1,3-Butadiene	0.86
12/4/2019 21:15	1,3-Butadiene	1.25
12/4/2019 21:04	1,3-Butadiene	1.05
12/4/2019 21:01	1,3-Butadiene	1.29
12/4/2019 20:55	1,3-Butadiene	2.55
12/4/2019 20:49	1,3-Butadiene	4.77
12/4/2019 20:48	1,3-Butadiene	1.47
12/4/2019 20:48	1,3-Butadiene	5
12/4/2019 20:45	1,3-Butadiene	0.74
12/4/2019 20:43	1,3-Butadiene	2.62
12/4/2019 20:43	1,3-Butadiene	5.78
12/4/2019 20:42	1,3-Butadiene	1.11
12/4/2019 20:42	1,3-Butadiene	3
12/4/2019 20:41	1,3-Butadiene	1.21
12/4/2019 20:37	1,3-Butadiene	2.81
12/4/2019 20:36	1,3-Butadiene	1.01
12/4/2019 20:34	1,3-Butadiene	2.62
12/4/2019 20:32	1,3-Butadiene	2.38
12/4/2019 20:32	1,3-Butadiene	5.58
12/4/2019 20:29	1,3-Butadiene	2.22
12/4/2019 20:27	1,3-Butadiene	2.88
12/4/2019 20:25	1,3-Butadiene	4.48
12/4/2019 20:25	1,3-Butadiene	2.28
12/4/2019 20:22	1,3-Butadiene	2.26
12/4/2019 20:21	1,3-Butadiene	2.6
12/4/2019 20:21	1,3-Butadiene	1.24
12/4/2019 20:18	1,3-Butadiene	2.8
12/4/2019 20:18	1,3-Butadiene	2.07
12/4/2019 20:17	1,3-Butadiene	5.1
12/4/2019 20:16	1,3-Butadiene	3.15
12/4/2019 20:15	1,3-Butadiene	1.95
12/4/2019 20:14	1,3-Butadiene	1.03
12/4/2019 20:13	1,3-Butadiene	3.5
12/4/2019 20:09	1,3-Butadiene	3.63
12/4/2019 20:09	1,3-Butadiene	1.58
12/4/2019 20:09	1,3-Butadiene	3.65
12/4/2019 20:07	1,3-Butadiene	0.85
12/4/2019 20:04	1,3-Butadiene	3.75
12/4/2019 20:04	1,3-Butadiene	2.69
12/4/2019 20:04	1,3-Butadiene	1.03
12/4/2019 20:02	1,3-Butadiene	1.02
12/4/2019 20:01	1,3-Butadiene	3.95
12/4/2019 20:01	1,3-Butadiene	3.6

12/4/2019 19:58	1,3-Butadiene	4.1
12/4/2019 19:58	1,3-Butadiene	3.39
12/4/2019 19:56	1,3-Butadiene	1.13
12/4/2019 19:56	1,3-Butadiene	3.17
12/4/2019 19:55	1,3-Butadiene	1.32
12/4/2019 19:50	1,3-Butadiene	4.17
12/4/2019 19:47	1,3-Butadiene	3.93
12/4/2019 19:47	1,3-Butadiene	2.63
12/4/2019 19:45	1,3-Butadiene	3.95
12/4/2019 19:42	1,3-Butadiene	4.18
12/4/2019 19:41	1,3-Butadiene	2.7
12/4/2019 19:38	1,3-Butadiene	4.1
12/4/2019 19:38	1,3-Butadiene	7.8
12/4/2019 19:37	1,3-Butadiene	2.74
12/4/2019 19:35	1,3-Butadiene	3.27
12/4/2019 19:32	1,3-Butadiene	3.05
12/4/2019 19:31	1,3-Butadiene	3.23
12/4/2019 19:30	1,3-Butadiene	1.78
12/4/2019 19:28	1,3-Butadiene	2.1
12/4/2019 19:25	1,3-Butadiene	2.7
12/4/2019 19:24	1,3-Butadiene	1.5
12/4/2019 19:19	1,3-Butadiene	4.81
12/4/2019 19:19	1,3-Butadiene	3.77
12/4/2019 19:17	1,3-Butadiene	5.06
12/4/2019 19:15	1,3-Butadiene	5.95
12/4/2019 19:12	1,3-Butadiene	0.59
12/4/2019 19:12	1,3-Butadiene	6.31
12/4/2019 19:11	1,3-Butadiene	5.15
12/4/2019 19:10	1,3-Butadiene	1.06
12/4/2019 19:10	1,3-Butadiene	3.94
12/4/2019 19:09	1,3-Butadiene	5
12/4/2019 19:06	1,3-Butadiene	1.31
12/4/2019 19:05	1,3-Butadiene	1.37
12/4/2019 19:05	1,3-Butadiene	0.5
12/4/2019 19:05	1,3-Butadiene	2.47
12/4/2019 19:01	1,3-Butadiene	3.66
12/4/2019 19:01	1,3-Butadiene	5.01
12/4/2019 18:59	1,3-Butadiene	1.01
12/4/2019 18:58	1,3-Butadiene	4.4
12/4/2019 18:57	1,3-Butadiene	4.86
12/4/2019 18:55	1,3-Butadiene	0.6
12/4/2019 18:53	1,3-Butadiene	6.22
12/4/2019 18:52	1,3-Butadiene	7.24
12/4/2019 18:48	1,3-Butadiene	0.64
12/4/2019 18:45	1,3-Butadiene	0.54
12/4/2019 18:44	1,3-Butadiene	0.58
12/4/2019 18:41	1,3-Butadiene	2.5

12/4/2019 18:38	1,3-Butadiene	0.75
12/4/2019 18:36	1,3-Butadiene	1.96
12/4/2019 18:36	1,3-Butadiene	0.72
12/4/2019 18:34	1,3-Butadiene	1.98
12/4/2019 18:34	1,3-Butadiene	0.68
12/4/2019 18:19	1,3-Butadiene	1.02
12/4/2019 18:18	1,3-Butadiene	0.87
12/4/2019 18:13	1,3-Butadiene	1.04
12/4/2019 18:13	1,3-Butadiene	1.04
12/4/2019 18:12	1,3-Butadiene	0.9
12/4/2019 18:10	1,3-Butadiene	0.99
12/4/2019 18:09	1,3-Butadiene	1.85
12/4/2019 18:08	1,3-Butadiene	0.69
12/4/2019 18:07	1,3-Butadiene	1.89
12/4/2019 18:06	1,3-Butadiene	0.74
12/4/2019 18:06	1,3-Butadiene	0.79
12/4/2019 18:03	1,3-Butadiene	0.74
12/4/2019 18:00	1,3-Butadiene	0.52
12/4/2019 17:59	1,3-Butadiene	1.18
12/4/2019 17:58	1,3-Butadiene	5
12/4/2019 17:58	1,3-Butadiene	12.09
12/4/2019 17:57	1,3-Butadiene	0.53
12/4/2019 17:55	1,3-Butadiene	0.71
12/4/2019 17:52	1,3-Butadiene	0.86
12/4/2019 17:50	1,3-Butadiene	1.08
12/4/2019 17:44	1,3-Butadiene	1.23
12/4/2019 17:41	1,3-Butadiene	0.8
12/4/2019 17:40	1,3-Butadiene	1.28
12/4/2019 17:38	1,3-Butadiene	0.74
12/4/2019 17:20	1,3-Butadiene	1.41
12/4/2019 17:18	1,3-Butadiene	1.2
12/4/2019 17:17	1,3-Butadiene	1.14
12/4/2019 17:16	1,3-Butadiene	2.7
12/4/2019 17:16	1,3-Butadiene	2.75
12/4/2019 17:14	1,3-Butadiene	1.13
12/4/2019 17:11	1,3-Butadiene	1.3
12/4/2019 17:09	1,3-Butadiene	1.56
12/4/2019 17:08	1,3-Butadiene	1.55
12/4/2019 17:06	1,3-Butadiene	1.78
12/4/2019 17:03	1,3-Butadiene	0.66
12/4/2019 17:00	1,3-Butadiene	1.46
12/4/2019 16:54	1,3-Butadiene	0.76
12/4/2019 16:36	1,3-Butadiene	0.62
12/3/2019 8:43	1,3-Butadiene	1.1
12/3/2019 8:43	1,3-Butadiene	1.14
12/3/2019 8:22	1,3-Butadiene	1.35
11/30/2019 7:38	1,3-Butadiene	0.75

11/30/2019 7:33	1,3-Butadiene	0.63
11/30/2019 6:11	1,3-Butadiene	1
11/30/2019 5:35	1,3-Butadiene	1
12/4/2019 20:51	VOCs*	5.6
12/4/2019 20:44	VOCs*	6.5
12/4/2019 20:36	VOCs*	6.3
12/4/2019 20:27	VOCs*	5.3
12/4/2019 20:20	VOCs*	5.7
12/4/2019 19:47	VOCs*	5.4
12/4/2019 19:44	VOCs*	5.1
12/4/2019 19:40	VOCs*	5.5
12/4/2019 19:34	VOCs*	5.6
12/4/2019 18:58	VOCs*	5
12/4/2019 18:50	VOCs*	6
12/4/2019 17:58	VOCs*	12.9

Attachment C

Preliminary Analytical Air Sampling Locations

CTEH

Analytical Sampling Locations (TO-15)

South 4 Group Fire | Port Neches, TX | Locations Outside of 1 Mile as of December 9, 2019 09:00 CST

Project: 112312
Client: TPC
City: Port Neches, TX
County: Jefferson

COORDINATE SYSTEM: NAD 1983 UTM Zone 15N DATUM: North American 1983

LAST UPDATED: 12/9/2019 11:18:41 AM

Attachment D

Preliminary Analytical Data Summaries for VOCs

South 4 Group Fire

Compounds of Interest (TO-15) | Outside of 1 Mile | Analytical Air Sampling Detection Summary by Location

L2 Verified Data as of 12/8/2019 7:17:10 AM

Location Code	Analyte	Count of Samples	Distinct count of Detections	Average of Detections (ppbv)	Detection Range
AS001	1,3-Butadiene	1	1	0.124	0.124 - 0.124 ppbv
	Benzene	1	1	0.228	0.228 - 0.228 ppbv
	Butane	1	1	3.460	3.46 - 3.46 ppbv
AS006	1,2,4-Trimethylbenzene	8	5	0.140	0.0847 - 0.311 ppbv
	1,3-Butadiene	8	5	59.770	0.442 - 267 ppbv
	Benzene	8	8	0.440	0.161 - 1.23 ppbv
	Butane	8	8	11.198	1.3 - 57 ppbv
	Ethylbenzene	8	5	0.109	0.0645 - 0.213 ppbv
	MTBE	8	4	0.324	0.0645 - 1.05 ppbv
	Naphthalene	8	2	0.257	0.191 - 0.323 ppbv
	m&p-Xylene	8	8	0.268	0.095 - 0.826 ppbv
	o-Xylene	8	6	0.132	0.0809 - 0.286 ppbv
AS007	1,2,4-Trimethylbenzene	8	4	0.164	0.0704 - 0.301 ppbv
	1,3-Butadiene	8	4	8.785	0.648 - 20.5 ppbv
	Benzene	8	8	0.390	0.112 - 0.879 ppbv
	Butane	8	8	5.497	0.985 - 14.2 ppbv
	Ethylbenzene	8	3	0.152	0.0875 - 0.208 ppbv
	MTBE	8	3	0.175	0.0717 - 0.349 ppbv
	Naphthalene	8	2	0.392	0.229 - 0.554 ppbv
	m&p-Xylene	8	6	0.324	0.145 - 0.68 ppbv
	o-Xylene	8	5	0.156	0.0662 - 0.292 ppbv
AS008	1,2,4-Trimethylbenzene	8	7	0.113	0.0624 - 0.302 ppbv
	1,3-Butadiene	8	6	27.070	0.0603 - 128 ppbv
	Benzene	8	8	0.438	0.138 - 0.925 ppbv
	Butane	8	8	9.910	1.63 - 32.8 ppbv
	Ethylbenzene	8	4	0.189	0.0945 - 0.411 ppbv
	MTBE	8	1	0.667	0.667 - 0.667 ppbv
	Naphthalene	8	3	1.640	0.579 - 2.49 ppbv
	m&p-Xylene	8	7	0.309	0.11 - 0.839 ppbv
	o-Xylene	8	5	0.232	0.0665 - 0.705 ppbv
AS009	1,2,4-Trimethylbenzene	8	4	0.174	0.09 - 0.264 ppbv
	1,3-Butadiene	8	6	11.920	0.165 - 54 ppbv
	Benzene	8	8	0.446	0.143 - 1.1 ppbv
	Butane	8	8	7.929	1.35 - 25.3 ppbv
	Ethylbenzene	8	3	0.236	0.135 - 0.298 ppbv
	MTBE	8	1	0.531	0.531 - 0.531 ppbv
	Naphthalene	8	3	0.458	0.316 - 0.714 ppbv
	m&p-Xylene	8	7	0.389	0.102 - 0.963 ppbv
	o-Xylene	8	3	0.291	0.155 - 0.394 ppbv
AS010	1,2,4-Trimethylbenzene	5	4	0.126	0.11 - 0.141 ppbv
	1,3-Butadiene	5	1	0.295	0.295 - 0.295 ppbv
	Benzene	5	5	0.314	0.181 - 0.655 ppbv
	Butane	5	5	2.030	1.18 - 3.63 ppbv
	Ethylbenzene	5	2	0.104	0.0659 - 0.143 ppbv

South 4 Group Fire

Compounds of Interest (TO-15) | Outside of 1 Mile | Analytical Air Sampling Detection Summary by Location

L2 Verified Data as of 12/8/2019 7:17:10 AM

Location Code	Analyte	Count of Samples	Distinct count of Detections	Average of Detections (ppbv)	Detection Range
AS010	m&p-Xylene	5	4	0.264	0.107 - 0.464 ppbv
	o-Xylene	5	3	0.118	0.066 - 0.175 ppbv
AS011	1,2,4-Trimethylbenzene	8	5	0.165	0.0601 - 0.284 ppbv
	1,3-Butadiene	8	6	2.775	0.109 - 11.7 ppbv
	Benzene	8	8	0.434	0.112 - 1.05 ppbv
	Butane	8	8	3.894	1.26 - 8.06 ppbv
	Ethylbenzene	8	4	0.164	0.112 - 0.204 ppbv
	MTBE	8	3	0.134	0.0991 - 0.194 ppbv
	Naphthalene	8	2	2.674	0.378 - 4.97 ppbv
	m&p-Xylene	8	6	0.379	0.115 - 0.751 ppbv
	o-Xylene	8	5	0.188	0.0831 - 0.314 ppbv
AS012	1,2,4-Trimethylbenzene	8	6	0.160	0.071 - 0.363 ppbv
	1,3-Butadiene	8	5	2.031	0.269 - 4.8 ppbv
	Benzene	8	8	0.562	0.184 - 1.91 ppbv
	Butane	8	8	5.246	1.51 - 18.2 ppbv
	Ethylbenzene	8	4	0.180	0.0748 - 0.307 ppbv
	Naphthalene	8	1	10.200	10.2 - 10.2 ppbv
	m&p-Xylene	8	8	0.450	0.108 - 1.73 ppbv
	o-Xylene	8	6	0.231	0.0783 - 0.698 ppbv
AS013	1,2,4-Trimethylbenzene	7	6	0.126	0.0603 - 0.197 ppbv
	1,3-Butadiene	7	5	0.640	0.196 - 1.24 ppbv
	Benzene	7	7	0.366	0.129 - 0.765 ppbv
	Butane	7	7	3.660	1.54 - 5.55 ppbv
	Ethylbenzene	7	5	0.159	0.0871 - 0.245 ppbv
	m&p-Xylene	7	7	0.463	0.108 - 1.34 ppbv
	o-Xylene	7	6	0.214	0.0684 - 0.467 ppbv
AS014	1,2,4-Trimethylbenzene	5	5	0.097	0.0611 - 0.163 ppbv
	1,3-Butadiene	5	2	0.899	0.628 - 1.17 ppbv
	Benzene	5	5	0.233	0.166 - 0.385 ppbv
	Butane	5	5	1.750	0.997 - 3.63 ppbv
	Ethylbenzene	5	2	0.086	0.0675 - 0.105 ppbv
	m&p-Xylene	5	4	0.202	0.151 - 0.303 ppbv
	o-Xylene	5	4	0.096	0.0688 - 0.13 ppbv
AS015	1,2,4-Trimethylbenzene	5	4	0.118	0.0831 - 0.164 ppbv
	1,3-Butadiene	5	1	0.652	0.652 - 0.652 ppbv
	Benzene	5	5	0.271	0.154 - 0.41 ppbv
	Butane	5	5	2.384	1.14 - 3.78 ppbv
	Ethylbenzene	5	3	0.096	0.0673 - 0.145 ppbv
	m&p-Xylene	5	4	0.263	0.158 - 0.442 ppbv
	o-Xylene	5	4	0.129	0.0732 - 0.186 ppbv
AS016	1,2,4-Trimethylbenzene	5	1	0.092	0.0919 - 0.0919 ppbv
	1,3-Butadiene	5	3	1.291	0.162 - 2.49 ppbv
	Benzene	5	5	0.253	0.0728 - 0.475 ppbv
	Butane	5	5	2.522	0.848 - 3.56 ppbv

South 4 Group Fire

Compounds of Interest (TO-15) | Outside of 1 Mile | Analytical Air Sampling Detection Summary by Location

L2 Verified Data as of 12/8/2019 7:17:10 AM

Location Code	Analyte	Count of Samples	Distinct count of Detections	Average of Detections (ppbv)	Detection Range
AS016	m&p-Xylene	5	3	0.151	0.125 - 0.181 ppbv
	o-Xylene	5	2	0.069	0.0641 - 0.0736 ppbv
AS017	1,2,4-Trimethylbenzene	4	4	0.107	0.0746 - 0.14 ppbv
	Benzene	4	4	0.292	0.157 - 0.394 ppbv
	Butane	4	4	6.695	2.17 - 15.2 ppbv
	Ethylbenzene	4	4	0.101	0.0663 - 0.17 ppbv
	m&p-Xylene	4	4	0.277	0.169 - 0.484 ppbv
	o-Xylene	4	4	0.138	0.102 - 0.217 ppbv
AS018	1,2,4-Trimethylbenzene	4	4	0.080	0.0637 - 0.0921 ppbv
	Benzene	4	4	0.205	0.121 - 0.377 ppbv
	Butane	4	4	7.003	0.923 - 23.4 ppbv
	Ethylbenzene	4	1	0.101	0.101 - 0.101 ppbv
	m&p-Xylene	4	3	0.208	0.154 - 0.307 ppbv
	o-Xylene	4	3	0.098	0.074 - 0.133 ppbv
AS019	1,2,4-Trimethylbenzene	7	5	0.120	0.0706 - 0.146 ppbv
	1,3-Butadiene	7	4	0.325	0.166 - 0.554 ppbv
	Benzene	7	7	0.360	0.164 - 0.828 ppbv
	Butane	7	7	4.553	0.602 - 9.98 ppbv
	Ethylbenzene	7	4	0.131	0.0626 - 0.204 ppbv
	Naphthalene	7	2	0.418	0.407 - 0.429 ppbv
	m&p-Xylene	7	6	0.357	0.127 - 0.955 ppbv
	o-Xylene	7	6	0.150	0.0634 - 0.344 ppbv
AS020	1,2,4-Trimethylbenzene	7	5	0.129	0.0747 - 0.165 ppbv
	1,3-Butadiene	7	4	28.353	3.31 - 67.6 ppbv
	Benzene	7	6	0.471	0.189 - 0.963 ppbv
	Butane	7	7	9.449	1.04 - 18.7 ppbv
	Ethylbenzene	7	4	0.148	0.108 - 0.201 ppbv
	MTBE	7	2	0.439	0.0896 - 0.788 ppbv
	Naphthalene	7	1	0.436	0.436 - 0.436 ppbv
	m&p-Xylene	7	6	0.354	0.0948 - 0.7 ppbv
	o-Xylene	7	5	0.158	0.101 - 0.24 ppbv
AS021	1,2,4-Trimethylbenzene	7	5	0.160	0.0838 - 0.274 ppbv
	1,3-Butadiene	7	4	16.593	2.87 - 25.9 ppbv
	Benzene	7	7	0.409	0.139 - 0.861 ppbv
	Butane	7	7	6.339	1.67 - 12.4 ppbv
	Ethylbenzene	7	4	0.160	0.128 - 0.181 ppbv
	MTBE	7	4	0.766	0.147 - 1.83 ppbv
	Naphthalene	7	2	0.514	0.226 - 0.802 ppbv
	m&p-Xylene	7	5	0.414	0.125 - 0.569 ppbv
	o-Xylene	7	5	0.165	0.0655 - 0.214 ppbv
AS022	1,2,4-Trimethylbenzene	7	5	0.075	0.061 - 0.101 ppbv
	1,3-Butadiene	7	7	3.068	0.573 - 16.7 ppbv
	Benzene	7	6	1.982	0.227 - 6.16 ppbv
	Butane	7	7	5.087	1.31 - 13.9 ppbv

South 4 Group Fire

Compounds of Interest (TO-15) | Outside of 1 Mile | Analytical Air Sampling Detection Summary by Location

L2 Verified Data as of 12/8/2019 7:17:10 AM

Location Code	Analyte	Count of Samples	Distinct count of Detections	Average of Detections (ppbv)	Detection Range
AS022	Ethylbenzene	7	4	0.069	0.0603 - 0.085 ppbv
	MTBE	7	2	0.156	0.11 - 0.202 ppbv
	Naphthalene	7	3	0.849	0.223 - 2.1 ppbv
	m&p-Xylene	7	5	0.166	0.136 - 0.215 ppbv
	o-Xylene	7	4	0.089	0.071 - 0.104 ppbv
AS024	1,2,4-Trimethylbenzene	6	4	0.150	0.095 - 0.172 ppbv
	1,3-Butadiene	6	3	4.800	1.51 - 6.91 ppbv
	Benzene	6	6	0.418	0.112 - 0.827 ppbv
	Butane	6	6	4.554	1.71 - 7.75 ppbv
	Ethylbenzene	6	3	0.135	0.122 - 0.155 ppbv
	MTBE	6	2	0.358	0.226 - 0.49 ppbv
	Naphthalene	6	1	0.209	0.209 - 0.209 ppbv
	m&p-Xylene	6	5	0.323	0.0948 - 0.491 ppbv
	o-Xylene	6	4	0.164	0.0928 - 0.192 ppbv
AS026	1,2,4-Trimethylbenzene	3	3	0.087	0.0656 - 0.105 ppbv
	1,3-Butadiene	3	3	0.563	0.113 - 1.06 ppbv
	Benzene	3	3	0.779	0.502 - 1.15 ppbv
	Butane	3	3	3.910	3.64 - 4.28 ppbv
	Ethylbenzene	3	3	0.082	0.0677 - 0.105 ppbv
	Naphthalene	3	2	0.321	0.295 - 0.347 ppbv
	m&p-Xylene	3	3	0.239	0.18 - 0.317 ppbv
	o-Xylene	3	3	0.104	0.0897 - 0.128 ppbv
AS027	1,2,4-Trimethylbenzene	3	2	0.072	0.0652 - 0.0778 ppbv
	1,3-Butadiene	3	3	60.000	22.7 - 133 ppbv
	Benzene	3	3	0.806	0.455 - 1.05 ppbv
	Butane	3	3	16.963	8.99 - 27.2 ppbv
	Ethylbenzene	3	3	0.103	0.0818 - 0.138 ppbv
	MTBE	3	1	0.355	0.355 - 0.355 ppbv
	Naphthalene	3	1	0.226	0.226 - 0.226 ppbv
	m&p-Xylene	3	3	0.216	0.199 - 0.228 ppbv
	o-Xylene	3	3	0.086	0.0736 - 0.0934 ppbv
AS028	1,2,4-Trimethylbenzene	3	2	0.103	0.0843 - 0.121 ppbv
	1,3-Butadiene	3	3	12.352	0.337 - 35.4 ppbv
	Benzene	3	3	0.584	0.303 - 0.976 ppbv
	Butane	3	3	8.747	4.98 - 13.6 ppbv
	Ethylbenzene	3	3	0.096	0.0647 - 0.134 ppbv
	MTBE	3	1	0.283	0.283 - 0.283 ppbv
	m&p-Xylene	3	3	0.279	0.193 - 0.427 ppbv
	o-Xylene	3	3	0.118	0.0807 - 0.164 ppbv

Attachment E

Preliminary Asbestos Analytical Data Summary

Preliminary Integrated Air Sampling Laboratory Results | Fiber/Asbestos (Outside of One Mile Radius)

South 4 Group Fire | Data as of 12/9/2019 4:08:36 PM

Not Analyzed
Pending TEM Analysis
TEM Non-detection

Location Code	Location Description	Sampling Date	Sample Number	Sample Volume (L)	PCM Sample Concentration (f/cc)[1]	TEM Sample Concentration (f/cc)[2]
AS006	On fence corner near entrance to Ridgewood Elementary and Bella Vita St.	11/27/2019	PNTX1127AB006	674.4	<0.004	<0.0040
		11/28/2019	PNTX1128AB006	777.1	<0.003	<0.0035
		11/29/2019	PNTX1128AB006N	736.7	<0.004	<0.0037
			PNTX1129AB006	1016.32	<0.003	<0.0027
		11/30/2019	PNTX1130AB006	800.03	<0.003	<0.0034
			PNTX1130AB006N	916.59	<0.003	<0.0029
		12/1/2019	PNTX1201AB006	743.2	<0.004	<0.0036
		12/2/2019	PNTX1201AB006N	654.4	<0.004	<0.0041
			PNTX1202AB006	724.1	<0.004	<0.0037
		12/3/2019	PNTX1202AB006N	675.75	<0.004	<0.0040
			PNTX1203AB006	738.7	<0.004	Pending Analysis
		12/4/2019	PNTX1203AB006N	696.8	<0.004	Pending Analysis
			PNTX1204AB006	838.4	<0.003	Pending Analysis
		12/5/2019	PNTX1204AB006N	711.02	<0.004	Pending Analysis
			PNTX1205AB006	711.59	<0.004	Pending Analysis
		12/6/2019	PNTX1205AB006N	763.3	<0.004	Pending Analysis
		12/7/2019	PNTX1206AB006N	688.54	<0.004	Pending Analysis
AS007	Fence line SE of Bent Tree apartments across from Brazos Ave.	11/27/2019	PNTX1127AB007	655.2	<0.004	<0.0041
		11/28/2019	PNTX1128AB007	809.9	<0.003	<0.0033
		11/29/2019	PNTX1128AB007N	761.9	<0.004	<0.0035
			PNTX1129AB007	848.08	<0.003	<0.0032
			PNTX1129AB007N	774.67	<0.003	<0.0035
		11/30/2019	PNTX1130AB007	1131.82	0.0030	<0.0024
		12/1/2019	PNTX1201AB007	786.9	<0.003	<0.0034
		12/2/2019	PNTX1201AB007N	651.9	<0.004	<0.0041
			PNTX1202AB007	748.9	<0.004	<0.0036
		12/3/2019	PNTX1202AB007N	654.15	0.0050	<0.0041
			PNTX1203AB007	739.5	<0.004	Pending Analysis
		12/4/2019	PNTX1203AB007N	709.88	<0.004	Pending Analysis
			PNTX1204AB007	828.09	<0.003	Pending Analysis
		12/5/2019	PNTX1204AB007N	702.69	<0.004	Pending Analysis
			PNTX1205AB007	707.67	<0.004	Pending Analysis
		12/6/2019	PNTX1205AB007N	767.4	<0.004	Pending Analysis
			PNTX1206AB007	679.45	<0.004	Pending Analysis
		12/7/2019	PNTX1206AB007N	721.5	<0.004	Pending Analysis

Non-detections are reported as less than ("<") the laboratory reporting limit.
[1]Total fiber concentration per cubic centimeter (f/cc) by Phase Contrast Microscopy (PCM), NIOSH method 7400.
[2]Asbestos fiber concentration per cubic centimeter (f/cc) by Transmission Electron Microscopy (TEM) NIOSH method 7402.

Preliminary Integrated Air Sampling Laboratory Results | Fiber/Asbestos (Outside of One Mile Radius)

South 4 Group Fire | Data as of 12/9/2019 4:08:36 PM

- Not Analyzed
- Pending TEM Analysis
- TEM Non-detection

Location Code	Location Description	Sampling Date	Sample Number	Sample Volume (L)	PCM Sample Concentration (f/cc)[1]	TEM Sample Concentration (f/cc)[2]
AS008	Fence corner behind H-E-B supermark on SE side	11/27/2019	PNTX1127AB008	649.2	<0.004	<0.0042
		11/28/2019	PNTX1128AB008	792.3	<0.003	<0.0034
		11/29/2019	PNTX1128AB008N	751.21	<0.004	<0.0036
			PNTX1129AB008	862.83	<0.003	<0.0031
			PNTX1129AB008N	761.77	<0.004	<0.0035
		11/30/2019	PNTX1130AB008	1142.21	<0.002	<0.0024
		12/1/2019	PNTX1201AB008	791.1	<0.003	<0.0034
		12/2/2019	PNTX1201AB008N	653.02	<0.004	<0.0039
			PNTX1202AB008	740.4	<0.004	<0.0036
		12/3/2019	PNTX1202AB008N	671.65	<0.004	<0.0040
			PNTX1203AB008	738.6	<0.004	Pending Analysis
		12/4/2019	PNTX1203AB008N	707.37	<0.004	Pending Analysis
			PNTX1204AB008	832.5	<0.003	Pending Analysis
		12/5/2019	PNTX1204AB008N	706.49	<0.004	Pending Analysis
			PNTX1205AB008	707.74	<0.004	Pending Analysis
		12/6/2019	PNTX1205AB008N	764.1	<0.004	Pending Analysis
			PNTX1206AB008	706.19	<0.004	Pending Analysis
		12/7/2019	PNTX1206AB008N	690	<0.004	Pending Analysis
AS009	End of fenceline next to warehouse across from tennis courts	11/27/2019	PNTX1127AB009	688.1	<0.004	<0.0039
		11/28/2019	PNTX1128AB009	770.6	<0.004	<0.0035
		11/29/2019	PNTX1128AB009N	734.8	<0.004	<0.0037
			PNTX1129AB009	1027.92	<0.003	<0.0026
		11/30/2019	PNTX1130AB009	816.73	<0.003	<0.0033
			PNTX1130AB009N	1107.32	<0.002	<0.0024
		12/1/2019	PNTX1201AB009	739	<0.004	<0.0037
		12/2/2019	PNTX1201AB009N	747.5	<0.004	<0.0036
			PNTX1201AB009ND	741.23	<0.004	<0.0036
			PNTX1202AB009	746.7	<0.004	<0.0036
		12/3/2019	PNTX1202AB009N	722.15	0.0050	<0.0037
			PNTX1203AB009	725.4	<0.004	Pending Analysis
		12/4/2019	PNTX1203AB009N	728.41	<0.004	Pending Analysis
			PNTX1204AB009	781.1	<0.003	Pending Analysis
		12/5/2019	PNTX1204AB009N	716.88	<0.004	Pending Analysis
			PNTX1205AB009	668.11	<0.004	Pending Analysis
		12/6/2019	PNTX1205AB009N	808.54	<0.003	Pending Analysis

Non-detections are reported as less than ("<") the laboratory reporting limit.
[1]Total fiber concentration per cubic centimeter (f/cc) by Phase Contrast Microscopy (PCM), NIOSH method 7400.
[2]Asbestos fiber concentration per cubic centimeter (f/cc) by Transmission Electron Microscopy (TEM) NIOSH method 7402.

Preliminary Integrated Air Sampling Laboratory Results | Fiber/Asbestos (Outside of One Mile Radius)

South 4 Group Fire | Data as of 12/9/2019 4:08:36 PM

Not Analyzed
Pending TEM Analysis
TEM Non-detection

Location Code	Location Description	Sampling Date	Sample Number	Sample Volume (L)	PCM Sample Concentration (f/cc)[1]	TEM Sample Concentration (f/cc)[2]
AS009	End of fenceline next to warehouse across from tennis courts	12/6/2019	PNTX1206AB009	675.86	<0.004	Pending Analysis
		12/7/2019	PNTX1206AB009N	711.12	<0.004	Pending Analysis
AS010	Back parking lot of Park Oil Company on fence	11/27/2019	PNTX1127AB010	704.5	<0.004	<0.0038
		11/28/2019	PNTX1128AB010	770.1	<0.004	<0.0035
		11/29/2019	PNTX1128AB010N	751	<0.004	<0.0036
			PNTX1129AB010	991.7	<0.003	<0.0027
		11/30/2019	PNTX1130AB010	780.56	<0.003	<0.0035
			PNTX1130AB010N	865.94	<0.003	<0.0031
		12/1/2019	PNTX1201AB010	796.7	<0.003	<0.0034
AS011	Fenceline behind Planet Fitness in the side parking lot	11/27/2019	PNTX1127AB011	632.5	<0.004	<0.0043
		11/28/2019	PNTX1128AB011	813.8	<0.003	<0.0033
		11/29/2019	PNTX1128AB011N	761.9	<0.004	<0.0035
			PNTX1129AB011	853.82	<0.003	<0.0032
			PNTX1129AB011N	783.06	<0.003	<0.0034
		11/30/2019	PNTX1130AB011	1008.23	<0.003	<0.0027
		12/1/2019	PNTX1201AB011	761.5	<0.004	<0.0035
		12/2/2019	PNTX1201AB011N	745.49	<0.004	<0.0036
			PNTX1202AB011	744.1	<0.004	<0.0036
		12/3/2019	PNTX1202AB011N	684.22	<0.004	<0.0039
			PNTX1203AB011	738.6	<0.004	Pending Analysis
			PNTX1203AB011N	760.54	<0.004	Pending Analysis
		12/4/2019	PNTX1204AB011	831.5	<0.003	Pending Analysis
		12/5/2019	PNTX1204AB011N	644.84	<0.004	Pending Analysis
			PNTX1205AB011	689.82	<0.004	Pending Analysis
		12/6/2019	PNTX1205AB011N	725.19	<0.004	Pending Analysis
			PNTX1206AB011	745.91	<0.004	Pending Analysis
		12/7/2019	PNTX1206AB011N	622.28	<0.004	Pending Analysis
AS012	Corner fence between USPS & Church on the Rock-South	11/27/2019	PNTX1127AB012	530.2	<0.005	<0.0051
		11/28/2019	PNTX1128AB012	941.8	<0.003	<0.0029
		11/29/2019	PNTX1128AB012N	776.6	<0.003	<0.0035
			PNTX1129AB012	845.27	<0.003	<0.0032
			PNTX1129AB012N	773.99	<0.003	<0.0035
		11/30/2019	PNTX1130AB012	1028.2	<0.003	<0.0026
		12/1/2019	PNTX1201AB012	727.7	<0.004	<0.0037
			PNTX1201AB012N	759.3	<0.004	<0.0036

Non-detections are reported as less than ("<") the laboratory reporting limit.
[1]Total fiber concentration per cubic centimeter (f/cc) by Phase Contrast Microscopy (PCM), NIOSH method 7400.
[2]Asbestos fiber concentration per cubic centimeter (f/cc) by Transmission Electron Microscopy (TEM) NIOSH method 7402.

Preliminary Integrated Air Sampling Laboratory Results | Fiber/Asbestos (Outside of One Mile Radius)

South 4 Group Fire | Data as of 12/9/2019 4:08:36 PM

Not Analyzed
Pending TEM Analysis
TEM Non-detection

Location Code	Location Description	Sampling Date	Sample Number	Sample Volume (L)	PCM Sample Concentration (f/cc)[1]	TEM Sample Concentration (f/cc)[2]
AS012	Corner fence between USPS & Church on the Rock-South	12/2/2019	PNTX1202AB012	775.8	<0.003	<0.0035
		12/3/2019	PNTX1202AB012N	703.4	<0.004	<0.0038
			PNTX1203AB012	736.6	<0.004	Pending Analysis
			PNTX1203AB012N	751.21	<0.004	Pending Analysis
		12/4/2019	PNTX1204AB012	828	<0.003	Pending Analysis
		12/5/2019	PNTX1204AB012N	647.94	<0.004	Pending Analysis
			PNTX1205AB012	686.64	<0.004	Pending Analysis
			PNTX1205AB012N	765.04	<0.004	Pending Analysis
		12/6/2019	PNTX1206AB012	732.64	<0.004	Pending Analysis
			PNTX1206AB012N	614.66	<0.004	Pending Analysis
AS013	Fence behind large bush on Terrell St. - near iintersection with Oakdale Dr.	11/27/2019	PNTX1127AB013	697.9	<0.004	<0.0039
		11/28/2019	PNTX1128AB013	784.6	<0.003	<0.0034
		11/29/2019	PNTX1128AB013N	737.5	<0.004	<0.0037
			PNTX1129AB013	1031.7	<0.003	<0.0026
		11/30/2019	PNTX1130AB013	864.91	<0.003	<0.0031
		12/1/2019	PNTX1130AB013N	490.25	<0.006	<0.0055
			PNTX1201AB013	735.4	<0.004	<0.0037
			PNTX1201AB013N	753.49	<0.004	<0.0036
		12/2/2019	PNTX1202AB013	760.2	<0.004	<0.0036
		12/3/2019	PNTX1202AB013N	692.94	<0.004	<0.0039
			PNTX1203AB013	730.1	<0.004	Pending Analysis
			PNTX1203AB013N	744.65	<0.004	Pending Analysis
		12/4/2019	PNTX1204AB013	810.9	<0.003	Pending Analysis
		12/5/2019	PNTX1204AB013N	647.03	<0.004	Pending Analysis
			PNTX1205AB013	690.94	<0.004	Pending Analysis
			PNTX1205AB013N	758.1	<0.004	Pending Analysis
		12/6/2019	PNTX1206AB013	751.91	<0.004	Pending Analysis
			PNTX1206AB013N	620.15	<0.004	Pending Analysis
AS014	Back fence of Memorial Stadium by handicap parking spots	11/27/2019	PNTX1127AB014	706.9	<0.004	<0.0038
			PNTX1127AB014D	701.9	<0.004	<0.0038
		11/28/2019	PNTX1128AB014	773.3	<0.003	<0.0035
		11/29/2019	PNTX1128AB014N	691.1	<0.004	<0.0039
			PNTX1129AB014	1038.8	<0.003	<0.0026
		11/30/2019	PNTX1130AB014	861.08	<0.003	<0.0031
		12/1/2019	PNTX1130AB014N	621.39	0.0060	<0.0043

Non-detections are reported as less than ("<") the laboratory reporting limit.
[1]Total fiber concentration per cubic centimeter (f/cc) by Phase Contrast Microscopy (PCM), NIOSH method 7400.
[2]Asbestos fiber concentration per cubic centimeter (f/cc) by Transmission Electron Microscopy (TEM) NIOSH method 7402.

Preliminary Integrated Air Sampling Laboratory Results | Fiber/Asbestos (Outside of One Mile Radius)

South 4 Group Fire | Data as of 12/9/2019 4:08:36 PM

Not Analyzed
Pending TEM Analysis
TEM Non-detection

Location Code	Location Description	Sampling Date	Sample Number	Sample Volume (L)	PCM Sample Concentration (f/cc)[1]	TEM Sample Concentration (f/cc)[2]
AS014	Back fence of Memorial Stadium by handicap parking spots	12/1/2019	PNTX1201AB014	752.3	<0.004	<0.0036
AS015	On fence in back west corner of Relax Inn parking lot	11/27/2019	PNTX1127AB015	707.4	<0.004	<0.0038
		11/28/2019	PNTX1128AB015	1033.9	<0.003	<0.0026
		11/29/2019	PNTX1129AB015	740.53	<0.004	<0.0036
			PNTX1129AB015N	818.63	<0.003	<0.0033
		11/30/2019	PNTX1130AB015	820.98	<0.003	<0.0033
			PNTX1130AB015D	820.98	Not Analyzed	
		12/1/2019	PNTX1130AB015N	524.6	<0.005	<0.0051
			PNTX1201AB015	752.7	<0.004	<0.0036
AS016	Nederland High School corner of tennis court fence	11/27/2019	PNTX1127AB016	708.9	<0.004	<0.0038
		11/28/2019	PNTX1128AB016	773.2	<0.003	<0.0035
		11/29/2019	PNTX1128AB016N	715	<0.004	<0.0038
			PNTX1129AB016	1034.1	<0.003	<0.0026
		11/30/2019	PNTX1130AB016	866.37	0.0040	<0.0031
		12/1/2019	PNTX1130AB016N	1015.19	<0.003	<0.0027
			PNTX1201AB016	729.3	<0.004	<0.0037
AS017	66th and W Port Arthur Rd. - abandoned discount store pole inside lot	11/27/2019	PNTX1127AB017	657.1	<0.004	<0.0041
		11/28/2019	PNTX1128AB017	1020.8	<0.003	<0.0026
		11/29/2019	PNTX1129AB017	714.81	<0.004	
			PNTX1129AB017N	905.75	<0.003	<0.0030
		11/30/2019	PNTX1130AB017	697.37	<0.004	<0.0039
		12/1/2019	PNTX1130AB017N	592.6	<0.005	<0.0046
			PNTX1201AB017	797.8	<0.003	<0.0034
AS018	58th St. - City of Port Arthur pump station fence	11/27/2019	PNTX1127AB018	740	<0.004	<0.0036
		11/28/2019	PNTX1128AB018	796.3	<0.003	<0.0034
		11/29/2019	PNTX1129AB018	761.77	<0.004	<0.0035
			PNTX1129AB018N	821.98	<0.003	<0.0033
		11/30/2019	PNTX1130AB018	865.75	<0.003	<0.0031
		12/1/2019	PNTX1130AB018N	593	<0.005	<0.0046
			PNTX1201AB018	782.8	<0.003	<0.0034
AS019	Texas Ave. - south side of Dollar General on telephone pole	11/27/2019	PNTX1127AB019	670.6	<0.004	<0.0040
		11/28/2019	PNTX1128AB019	828.8	<0.003	<0.0033
		11/29/2019	PNTX1129AB019	750.3	<0.004	<0.0036
			PNTX1129AB019N	807.46	<0.003	<0.0033
		11/30/2019	PNTX1130AB019	933.41	<0.003	<0.0029

Non-detections are reported as less than ("<") the laboratory reporting limit.
[1]Total fiber concentration per cubic centimeter (f/cc) by Phase Contrast Microscopy (PCM), NIOSH method 7400.
[2]Asbestos fiber concentration per cubic centimeter (f/cc) by Transmission Electron Microscopy (TEM) NIOSH method 7402.

Preliminary Integrated Air Sampling Laboratory Results | Fiber/Asbestos (Outside of One Mile Radius)

South 4 Group Fire | Data as of 12/9/2019 4:08:36 PM

Not Analyzed
Pending TEM Analysis
TEM Non-detection

Location Code	Location Description	Sampling Date	Sample Number	Sample Volume (L)	PCM Sample Concentration (f/cc)[1]	TEM Sample Concentration (f/cc)[2]
AS019	Texas Ave. - south side of Dollar General on telephone pole	12/1/2019	PNTX1130AB019N	530.42	<0.005	<0.0051
			PNTX1201AB019	717.8	0.0040	<0.0038
			PNTX1201AB019N	781.9	<0.003	<0.0035
		12/2/2019	PNTX1202AB019	717.6	<0.004	<0.0038
		12/3/2019	PNTX1202AB019N	718.23	<0.004	<0.0038
			PNTX1203AB019	732.8	<0.004	Pending Analysis
			PNTX1203AB019N	738.29	<0.004	Pending Analysis
		12/4/2019	PNTX1204AB019	755.3	<0.004	Pending Analysis
			PNTX1204AB019N	696.53	<0.004	Pending Analysis
		12/5/2019	PNTX1205AB019	696.74	<0.004	Pending Analysis
			PNTX1205AB019N	654.2	0.0050	Pending Analysis
		12/6/2019	PNTX1206AB019	761.15	<0.004	Pending Analysis
			PNTX1206AB019N	697.92	<0.004	Pending Analysis
AS020	Nederland water tower - west fence line	11/28/2019	PNTX1128AB020	1056.8	<0.003	<0.0026
		11/29/2019	PNTX1128AB020N	714.9	<0.004	<0.0038
			PNTX1129AB020	1037.8	<0.003	<0.0026
		11/30/2019	PNTX1130AB020	808.53	<0.003	<0.0033
		12/1/2019	PNTX1130AB020N	1004.1	<0.003	<0.0027
			PNTX1201AB020	739	<0.004	<0.0037
		12/2/2019	PNTX1202AB020	732	<0.004	<0.0037
		12/3/2019	PNTX1202AB020N	704.31	<0.004	<0.0038
			PNTX1203AB020	730.5	<0.004	Pending Analysis
			PNTX1203AB020D	731.6	<0.004	Pending Analysis
		12/4/2019	PNTX1203AB020N	753.33	<0.004	Pending Analysis
			PNTX1204AB020	783.9	<0.003	Pending Analysis
		12/5/2019	PNTX1204AB020N	711.41	<0.004	Pending Analysis
			PNTX1205AB020	693.55	<0.004	Pending Analysis
		12/6/2019	PNTX1205AB020N	820.06	<0.003	Pending Analysis
			PNTX1206AB020	655.59	<0.004	Pending Analysis
		12/7/2019	PNTX1206AB020N	701.06	<0.004	Pending Analysis
AS021	Dieu St. - corner of Entergy substation fence	11/28/2019	PNTX1128AB021	899.7	<0.003	<0.0030
		11/29/2019	PNTX1129AB021	707.71	<0.004	
			PNTX1129AB021N	801.77	<0.003	<0.0034
		11/30/2019	PNTX1130AB021	885.81	<0.003	<0.0030
		12/1/2019	PNTX1130AB021N	601.76	0.0070	<0.0045

Non-detections are reported as less than ("<") the laboratory reporting limit.

[1]Total fiber concentration per cubic centimeter (f/cc) by Phase Contrast Microscopy (PCM), NIOSH method 7400.

[2]Asbestos fiber concentration per cubic centimeter (f/cc) by Transmission Electron Microscopy (TEM) NIOSH method 7402.

Preliminary Integrated Air Sampling Laboratory Results | Fiber/Asbestos (Outside of One Mile Radius)

South 4 Group Fire | Data as of 12/9/2019 4:08:36 PM

Not Analyzed
Pending TEM Analysis
TEM Non-detection

Location Code	Location Description	Sampling Date	Sample Number	Sample Volume (L)	PCM Sample Concentration (f/cc)[1]	TEM Sample Concentration (f/cc)[2]
AS021	Dieu St. - corner of Entergy substation fence	12/1/2019	PNTX1201AB021	748.1	<0.004	<0.0036
		12/2/2019	PNTX1201AB021N	697.88	<0.004	<0.0041
			PNTX1202AB021	726.6	<0.004	<0.0037
		12/3/2019	PNTX1202AB021N	695.99	0.0040	<0.0039
			PNTX1203AB021	732.8	<0.004	Pending Analysis
		12/4/2019	PNTX1203AB021N	771.49	<0.004	Pending Analysis
			PNTX1204AB021	768	<0.004	Pending Analysis
		12/5/2019	PNTX1204AB021N	698.28	<0.004	Pending Analysis
			PNTX1205AB021	780.51	<0.003	Pending Analysis
		12/6/2019	PNTX1205AB021N	802.52	<0.003	Pending Analysis
			PNTX1206AB021	664.15	<0.004	Pending Analysis
		12/7/2019	PNTX1206AB021N	706.4	<0.004	Pending Analysis
AS022	Orchard Ave. fence - north side of Atlantic Canal	11/28/2019	PNTX1128AB022N	1005.6	<0.003	<0.0027
		11/29/2019	PNTX1129AB022	854.59	<0.003	<0.0032
			PNTX1129AB022N	763.71	<0.004	<0.0035
		11/30/2019	PNTX1130AB022	1024.68	<0.003	<0.0026
		12/1/2019	PNTX1201AB022	732.2	0.0080	<0.0037
			PNTX1201AB022N	768.9	<0.004	<0.0035
		12/2/2019	PNTX1202AB022	770.1	<0.004	<0.0035
		12/3/2019	PNTX1202AB022N	703.73	<0.004	<0.0038
			PNTX1203AB022	728.3	<0.004	Pending Analysis
			PNTX1203AB022N	727.34	<0.004	Pending Analysis
		12/4/2019	PNTX1204AB022	814.9	<0.003	Pending Analysis
		12/5/2019	PNTX1205AB022	703.48	<0.004	Pending Analysis
			PNTX1205AB022N	759.36	<0.004	Pending Analysis
		12/6/2019	PNTX1206AB022	751.1	<0.004	Pending Analysis
			PNTX1206AB022N	626.84	<0.004	Pending Analysis
AS024	Grigsby Ave. and Montgomery St. - telephone pole	11/29/2019	PNTX1129AB024N	805.95	<0.003	<0.0033
		11/30/2019	PNTX1130AB024	841	0.0040	<0.0032
		12/1/2019	PNTX1130AB024N	633.33	0.0060	<0.0043
			PNTX1201AB024	725.3	<0.004	<0.0037
		12/2/2019	PNTX1201AB024N	742.5	<0.004	<0.004
			PNTX1202AB024	736.9	<0.004	<0.0037
		12/3/2019	PNTX1202AB024N	693.7	0.0060	<0.0039
			PNTX1203AB024	713.9	<0.004	Pending Analysis

Non-detections are reported as less than ("<") the laboratory reporting limit.
[1]Total fiber concentration per cubic centimeter (f/cc) by Phase Contrast Microscopy (PCM), NIOSH method 7400.
[2]Asbestos fiber concentration per cubic centimeter (f/cc) by Transmission Electron Microscopy (TEM) NIOSH method 7402.

Preliminary Integrated Air Sampling Laboratory Results | Fiber/Asbestos (Outside of One Mile Radius)

South 4 Group Fire | Data as of 12/9/2019 4:08:36 PM

- Not Analyzed
- Pending TEM Analysis
- TEM Non-detection

Location Code	Location Description	Sampling Date	Sample Number	Sample Volume (L)	PCM Sample Concentration (f/cc)[1]	TEM Sample Concentration (f/cc)[2]
AS024	Grigsby Ave. and Montgomery St. - telephone pole	12/4/2019	PNTX1204AB024	781.8	<0.003	Pending Analysis
		12/5/2019	PNTX1204AB024N	708.12	<0.004	Pending Analysis
			PNTX1205AB024	684.53	<0.004	Pending Analysis
		12/6/2019	PNTX1205AB024N	818.69	<0.003	Pending Analysis
			PNTX1206AB024	659.39	<0.004	Pending Analysis
		12/7/2019	PNTX1206AB024N	708.79	<0.004	Pending Analysis
AS026	Light pole at NE Corner of Van Buren St. and Wilson St. - across street from NW side of Groves Middle School	12/1/2019	PNTX1201AB026	739.7	<0.004	<0.0036
			PNTX1201AB026N	745.8	<0.004	<0.0036
		12/2/2019	PNTX1202AB026	767.4	<0.004	<0.0035
		12/3/2019	PNTX1202AB026N	688.9	<0.004	<0.0039
			PNTX1203AB026	729.4	<0.004	Pending Analysis
			PNTX1203AB026N	763.59	<0.004	Pending Analysis
		12/4/2019	PNTX1204AB026	826.5	0.0030	Pending Analysis
		12/5/2019	PNTX1204AB026N	655.93	<0.004	Pending Analysis
			PNTX1205AB026	713.18	<0.004	Pending Analysis
			PNTX1205AB026N	726.06	<0.004	Pending Analysis
		12/6/2019	PNTX1206AB026	736.12	<0.004	Pending Analysis
		12/7/2019	PNTX1206AB026N	601.48	<0.004	Pending Analysis
AS027	Northeast of Huntsman office - near gate on side road	12/2/2019	PNTX1202AB027	761.9	<0.004	<0.0035
		12/3/2019	PNTX1202AB027N	611.06	0.0060	<0.0044
			PNTX1203AB027	756.8	<0.004	Pending Analysis
			PNTX1203AB027N	759.92	<0.004	Pending Analysis
		12/4/2019	PNTX1204AB027	822.9	<0.003	Pending Analysis
		12/5/2019	PNTX1204AB027N	649.23	<0.004	Pending Analysis
			PNTX1205AB027	773.5	<0.003	Pending Analysis
		12/6/2019	PNTX1205AB027N	667.02	<0.004	Pending Analysis
			PNTX1206AB027	791.7	<0.003	Pending Analysis
		12/7/2019	PNTX1206AB027N	594.27	<0.005	Pending Analysis
AS028	TPC Port Neches dock entrance road	12/2/2019	PNTX1202AB028	749.9	<0.004	<0.0036
		12/3/2019	PNTX1202AB028N	669.56	<0.004	<0.0040
			PNTX1203AB028	998.8	<0.003	Pending Analysis
		12/4/2019	PNTX1203AB028N	765.49	<0.004	Pending Analysis
			PNTX1204AB028	777.6	<0.003	Pending Analysis
		12/5/2019	PNTX1204AB028N	696.13	<0.004	Pending Analysis
			PNTX1205AB028	700.08	<0.004	Pending Analysis

Non-detections are reported as less than ("<") the laboratory reporting limit.
[1]Total fiber concentration per cubic centimeter (f/cc) by Phase Contrast Microscopy (PCM), NIOSH method 7400.
[2]Asbestos fiber concentration per cubic centimeter (f/cc) by Transmission Electron Microscopy (TEM) NIOSH method 7402.

Preliminary Integrated Air Sampling Laboratory Results | Fiber/Asbestos (Outside of One Mile Radius)

South 4 Group Fire | Data as of 12/9/2019 4:08:36 PM

Not Analyzed
Pending TEM Analysis
TEM Non-detection

Location Code	Location Description	Sampling Date	Sample Number	Sample Volume (L)	PCM Sample Concentration (f/cc)[1]	TEM Sample Concentration (f/cc)[2]
AS028	TPC Port Neches dock entrance road	12/6/2019	PNTX1205AB028N	802.37	<0.003	Pending Analysis
			PNTX1206AB028	659.32	<0.004	Pending Analysis
		12/7/2019	PNTX1206AB028N	707.66	<0.004	Pending Analysis
AS033	Corner of King George Rd and Roundtower Ln	12/6/2019	PNTX1206AB033	1672.17	<0.002	Pending Analysis
		12/7/2019	PNTX1206AB033N	1734.77	<0.002	Pending Analysis
AS034	On light pole between houses 2714 and 2718 on McBride Dr; north of fire hydrant	12/4/2019	PNTX1204AB034	2621.36	<0.001	<0.0010
		12/6/2019	PNTX1206AB034	1727.86	<0.002	Pending Analysis
		12/7/2019	PNTX1206AB034N	1710.99	<0.002	Pending Analysis
AS035	Powerline pole on the corner of Jacob Cir and Stephanie Dr	12/4/2019	PNTX1204AB035	2503.65	<0.001	<0.0011
		12/6/2019	PNTX1206AB035	1784.8	<0.002	Pending Analysis
			PNTX1206AB035N	1641.09	<0.002	Pending Analysis
AS036	Stop sign on the corner of Potomac and Pioneer Dr	12/4/2019	PNTX1204AB036	2491.6	<0.001	<0.0011
		12/6/2019	PNTX1206AB036	1815.3	<0.001	Pending Analysis
			PNTX1206AB036N	1391.5	<0.002	Pending Analysis

Non-detections are reported as less than ("<") the laboratory reporting limit.
[1]Total fiber concentration per cubic centimeter (f/cc) by Phase Contrast Microscopy (PCM), NIOSH method 7400.
[2]Asbestos fiber concentration per cubic centimeter (f/cc) by Transmission Electron Microscopy (TEM) NIOSH method 7402.

Attachment F

Preliminary PAH Analytical Data Summary

South 4 Group Fire

PAH | Outside 1 Mile

Lab COC:281904354 | Data as of 12/9/2019 5:27:05 PM

Location Code	Sample Number	Acenaphthylene (mdl = 0.62 ug)	Anthracene (mdl = 0.62 ug)	Benzo(a)anthracene (mdl = 0.31 ug)	Benzo(a)pyrene (mdl = 0.31 ug)	Benzo(b)fluoranthene (mdl = 0.31 ug)	Benzo(e)pyrene (mdl = 0.31 ug)	Benzo(g,h,i)perylene (mdl = 0.31 ug)	Benzo(k)fluoranthene (mdl = 0.31 ug)	Chrysene (mdl = 0.31 ug)	Dibenzo(a,h)anthracene (mdl = 0.31 ug)	Fluoranthene (mdl = 0.31 ug)	Fluorene (mdl = 0.62 ug)	Indeno(1,2,3-c,d)pyrene (mdl = 0.31 ug)	Naphthalene (mdl = 0.62 ug)	Phenanthrene (mdl = 0.31 ug)	Pyrene (mdl = 0.31 ug)
	PNTX1130PH006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS006	PNTX1130PH006N	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1201PH006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1129PH007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS007	PNTX1130PH007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1201PH007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1129PH008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS008	PNTX1130PH008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1201PH008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1130PH009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS009	PNTX1130PH009N	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1201PH009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS010	PNTX1201PH010	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1129PH011	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS011	PNTX1130PH011	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1201PH011	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1129PH012	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS012	PNTX1130PH012	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1201PH012	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS013	PNTX1201PH013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS014	PNTX1201PH014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS016	PNTX1201PH016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS017	PNTX1201PH017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1130PH019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS019	PNTX1130PH019N	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1201PH019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1130PH020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS020	PNTX1130PH020N	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1201PH020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1129PH021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS021	PNTX1130PH021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1130PH021N	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1201PH021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS022	PNTX1130PH022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1201PH022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1129PH024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS024	PNTX1130PH024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1130PH024N	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	PNTX1201PH024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AS026	PNTX1201PH026	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

South 4 Group Fire

Port Neches, TX

Preliminary Data Summary for the Reduction of Air Monitoring and Sampling Activities

December 19, 2019

Project #112312

	Name/Organization	Signature	Date Signed
Prepared by:	MICHAEL REILLY, PhD; CTEH	[signature]	12-19-19
Reviewed by:	Dana Szymkowicz, PhD; CTEH	[signature]	12-19-19
Approved by:	JASON SANDERS, TPC	[signature]	12-19-19
Approved by:	Hope Davila, TCEQ	[signature]	12/19/19
Approved by:	[illegible] JCOEM	[signature]	12-19-19
Approved by:			

1.0 Introduction

On November 27, 2019 at approximately 04:00 Central Standard Time (CST), TPC Group requested that CTEH® provide air monitoring and analytical air sampling support in response to an incident at the TPC Group facility located in Port Neches, Texas. CTEH® arrived on-site on November 27, 2019 at 08:00 CST and began real-time air monitoring and deploying analytical air sampling within the industrial areas and residential communities located around the TPC Facility.

Beginning approximately 10:00 CST on November 27, 2019, CTEH® conducted continuous real-time air monitoring and analytical air sampling within the industrial areas and residential communities located around the TPC Port Neches facility at a radius of up to 4 miles. On December 11th, 2019, Unified Command (UC) approved a reduction of real-time air monitoring and analytical air sampling throughout the extended community and focused air monitoring and sampling efforts within a 1-mile radius of the TPC group facility. This report will be used to support the reduction of real-time air monitoring and analytical air sampling throughout the extended community and focus on air monitoring and sampling efforts within the 0.5-mile radius of the TPC Group facility. This report summarizes the real-time air monitoring and analytical data collected outside of the 0.5-mile radius around the incident since 0600 November 8thth, 2019.

2.0 Air Monitoring Methods

CTEH® developed and implemented an Air Sampling Analysis Plan (SAP) to document and quantify the potential release of fugitive emissions from the incident at ground level. The SAP has been approved by local, state, and federal representatives of the on-site UC. In accordance with the SAP, sustained 1,3-butadiene detections of 0.5 ppm or greater and volatile organic compound (VOC) detections of 5.0 ppm or greater in the community are to be communicated to the Federal On-Scene Coordinator.

Real-time air monitoring was conducted for 1,3-butadiene, benzene, carbon monoxide (CO), fine-sized particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), styrene, volatile organic compounds (VOCs), and atmospheric flammability measured as the percentage of the lower explosive limit (%LEL). Real-time air monitoring was conducted using handheld instruments including Drager X-PID 8500, MultiRAEs, UltraRAEs, Gastec GV-100 handheld piston pumps (with colorimetric tubes), and TSI SidePak™ AM510/AM520 Aerosol Monitors. All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Target analytes were measured as listed in **Table 1** below. Roaming air monitoring was performed in with handheld instruments. All handheld air monitoring was conducted in the breathing zone.

3.0 Air Monitoring Results

As of December 18, 2019, over 80,000 real-time air monitoring readings have been taken throughout the community since the beginning of the response. Maps of the site location and real-time air monitoring locations outside of the 0.5-mile from the incident are provided in **Attachment A**. Table 1 summarizes the real-time air monitoring results collected outside of the 0.5-mile radius from the TPC Group facility location.

Table 1: Community Handheld Real-Time Air Monitoring Results (Outside of 0.5 mile Radius)

Analyte	Instrument	# of Readings	# of Detections	Range*
1,3-Butadiene	Drager X-PID 8500	997	21	0.07 - 0.17 ppm
	Gastec #174LL	1	1	0.1 ppm
	UltraRAE	9,167	17	0.01 - 0.57 ppm
Benzene	Drager X-PID 8500	797	0	< 0.02 ppm
Carbon Monoxide (CO)	MultiRAE	7	0	< 1 ppm
%LEL	MultiRAE	5,160	0	< 1 %
Nitrogen Dioxide (NO_2)	MultiRAE	238	0	< 0.1 ppm
Particulate Matter ($PM_{2.5}$)	AM510	678	678	0.001 - 0.27 mg/m^3
	AM520	210	210	0.003 - 0.108 mg/m^3
Styrene	Drager X-PID 8500	5	0	< 1 ppm
VOCs†	MultiRAE	10,153	10	0.1 - 0.4 ppm

*If no detection was observed, the instrument detection limit preceded by a "<" symbol is listed. These data have not undergone QAQC and should be considered preliminary at this time. †Volatile organic compounds. ‡These readings were observed prior to December 6, 2019

Since December 8, 2019 06:00 CST, CTEH has observed 1 exceedance of the UC-approved action level for 1,3-butadiene (0.5 ppm) outside of the 0.5-mile radius from the incident. The last exceedance of the UC-approved 1,3-butadiene action level outside of the 0.5-mile radius from the incident was observed on December 13, 2019 at 21:47 CST.

Since December 8, 2019 06:00 CST, CTEH has not observed any exceedances of the VOC action level outside of the 0.5-mile radius from the incident. The last exceedance of the UC-approved VOC action level outside of the one-mile radius from the incident was observed on December 4, 2019 at 20:51 CST.

4.0 Air Sampling Methods

CTEH® collected air samples in the surrounding community areas for laboratory analysis of airborne volatile organic compound (VOC) and asbestos. Maps of the site location and analytical air sample locations are provided in **Attachment B**. Whole air samples for VOCs were collected using 1.4-liter evacuated canisters with a 24-hour flow controller. These samples were deployed for 24-hour periods and sent to a third-party accredited laboratory for analysis of volatile organic compounds (VOCs)[1], including 1,3-butadiene, in accordance with the United States Environmental Protection Agency (US EPA) method TO-15. In addition, integrated air sampling was also conducted to document and quantify the potential presence of airborne asbestos fibers (if any). All asbestos samples were sent to an American Industrial Hygiene Association (AIHA)-accredited laboratory for analysis by NIOSH method 7400 phase contrast microscopy (PCM) and NIOSH method 7402 transmission electron microscopy (TEM). In addition, to ensure completeness, each laboratory report is also undergoing data verification and/or validation by an independent contractor.

5.0 Air Sampling Results

A summary of VOC detections for the chemicals of interest from samples collected outside of the 0.5-mile radius is provided in **Table 2**. A summary of asbestos sampling is provided in **Table 3**. A table of all analytical results outside of the 0.5-mile radius since December 8, 2019 is provided in **Appendix C and D.**

Table 2: Summary of VOC Analytical Air Sample Results | Half Mile Reduction

Analyte	Count of Lab Results	Count of Detections	Average of Detections	Detection Range
1,2,4-Trimethylbenzene	50	16	0.077 ppbv	0.0603 - 0.121 ppbv
1,3-Butadiene	50	24	3.323 ppbv	0.129 - 15.7 ppbv
Benzene	50	50	0.341 ppbv	0.106 - 1.35 ppbv
Butane	50	50	3.467 ppbv	0.646 - 15.4 ppbv
Ethylbenzene	50	13	0.079 ppbv	0.0601 - 0.118 ppbv
MTBE	50	15	0.978 ppbv	0.0888 - 3.11 ppbv
Naphthalene	50	1	0.155 ppbv	0.155 ppbv
M&p-Xylene	50	43	0.151 ppbv	0.1 - 0.342 ppbv
o-Xylene	50	28	0.081 ppbv	0.0648 - 0.129 ppbv

[1] Analysis also includes tentative identified compounds (TICs).

Table 3: Summary of Abestos Analytical Air Sample Results Collected Outside the 1-mile Radius*

Analytical Method	Analyte	Count of Lab Results	Count of Detections	Range of Detections
NIOSH 7402 (TEM)	Asbestos Fibers	55	0	< 0.0042 f/cc

*These data have not undergone complete Level II verification.

Since December 8th, a total of 68 analytical air samples have collected for asbestos analysis and a total of 139 analytical air samples have been analyzed via NIOSH method 7402 transmission electron microscopy (TEM).

6.0 Air monitoring and sampling strategy within the 1-mile radius of the TPC Group facility

Following a reduction in the geographic extent to air monitoring and sampling activities; CTEH will focus air monitoring and sampling activities within the 0.5-mile radius of the TPC Group facility.

CTEH will continue to conduct air monitoring and sampling activities 24-hours per day within the 0.5-mile radius of the TPC Group facility.

CTEH will continue to collect analytical air samples for VOCs and asbestos.

CTEH will discontinue air monitoring for combustions by-products including particulate (PM2.5), nitrogen dioxide (NO2). In the event of a significant fire, monitoring for these analytes in addition to others will be re-initiated.

CTEH may re-evaluate the location of analytical air sampling locations within the 0.5-mile radius to meet 360-degrees of coverage.

CTEH may conduct air monitoring assessments of nearby schools as requested by the district.

Attachment A

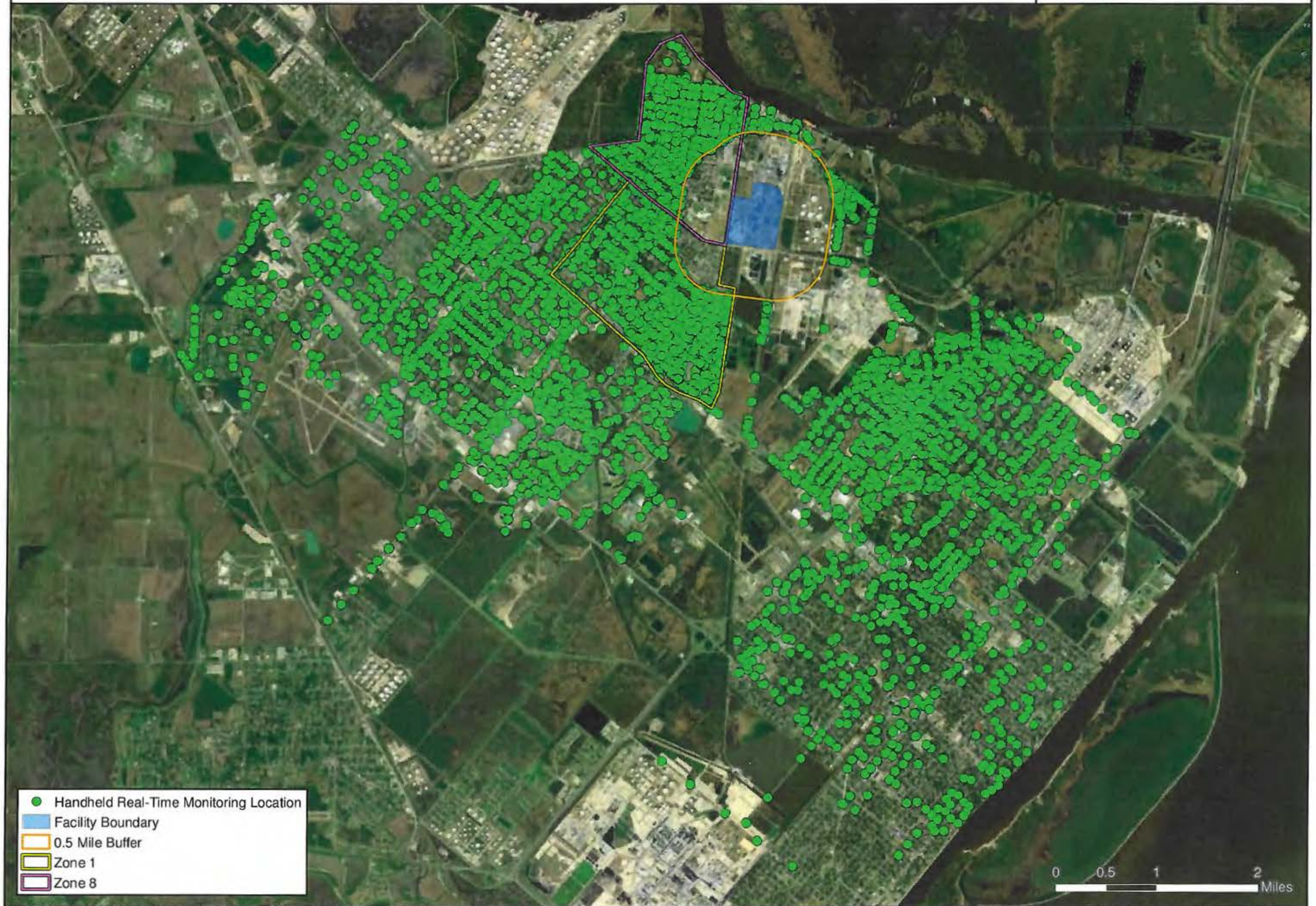
Map of Incident Location and Preliminary Real Time Monitoring Locations

CTEH

Handheld Real-Time Community Monitoring Locations | Outside 0.5 Miles

South 4 Group Fire l Port Neches, TX | 12/8/2019 06:00 - 12/18/2019 06:00 CST

Project: 112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *12/18/2019 3:42:04 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (Benzene)

South 4 Group Fire I Port Neches, TX | 12/8/2019 06:00 - 12/18/2019 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *12/18/2019 5:12:51 PM*

Handheld Real-Time Community Monitoring Locations (1,3-Butadiene Detections)

South 4 Group Fire l Port Neches, TX | 12/8/2019 06:00 - 12/18/2019 06:00 CST

Project: 112312
Client: TPC
City: Port Neches, TX.
County: Jefferson

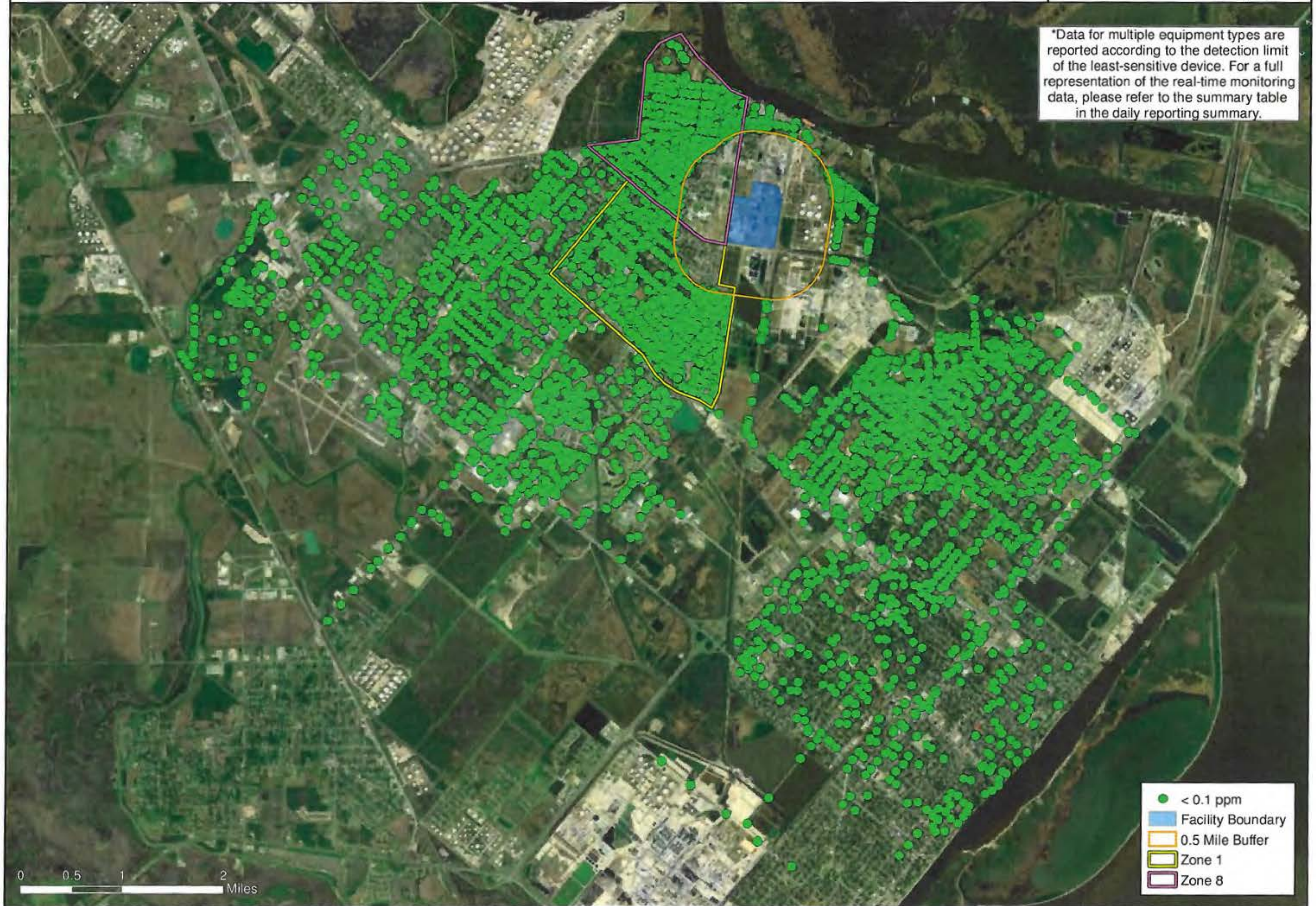
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* DATUM: *North American 1983* LAST UPDATED: *12/18/2019 5:41:51 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (1,3-Butadiene Non Detects)

South 4 Group Fire | Port Neches, TX | 12/8/2019 06:00 - 12/18/2019 06:00 CST

Project: 112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: NAD 1983 UTM Zone 15N DATUM: North American 1983 LAST UPDATED: 12/18/2019 5:33:43 PM

CTEH

Handheld Real-Time Community Monitoring Locations (Carbon Monoxide)

South 4 Group Fire I Port Neches, TX | 12/8/2019 06:00 - 12/18/2019 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

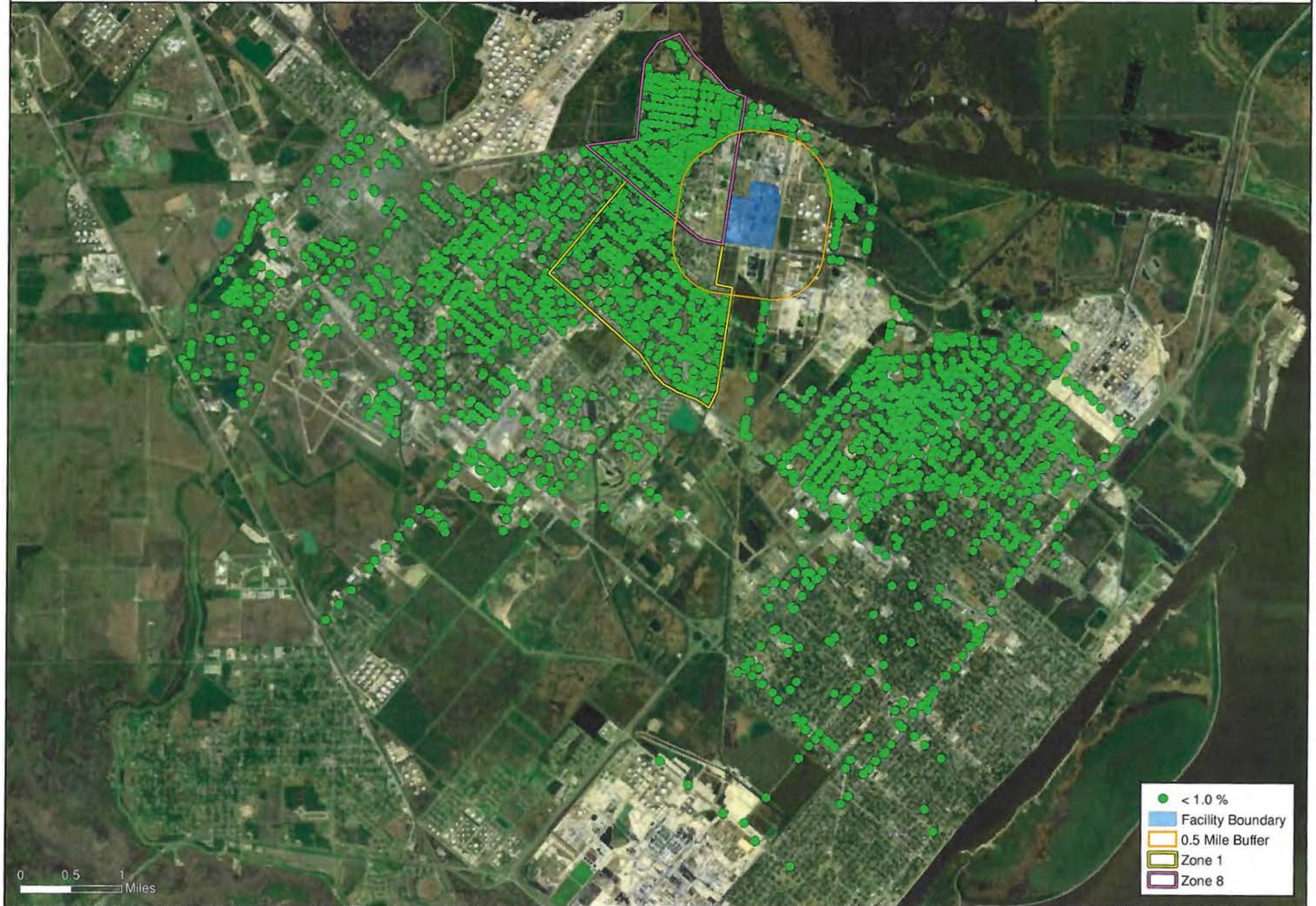
COORDINATE SYSTEM: NAD 1983 UTM Zone 15N DATUM: North American 1983 LAST UPDATED: 12/18/2019 3:49:12 PM

CTEH

Handheld Real-Time Community Monitoring Locations (%LEL)

South 4 Group Fire l Port Neches, TX | 12/8/2019 06:00 - 12/18/2019 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *12/18/2019 4:13:14 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (NO_2)

South 4 Group Fire I Port Neches, TX | 12/8/2019 06:00 - 12/18/2019 06:00 CST

Project: 112312
Client: TPC
City: Port Neches, TX
County: Jefferson

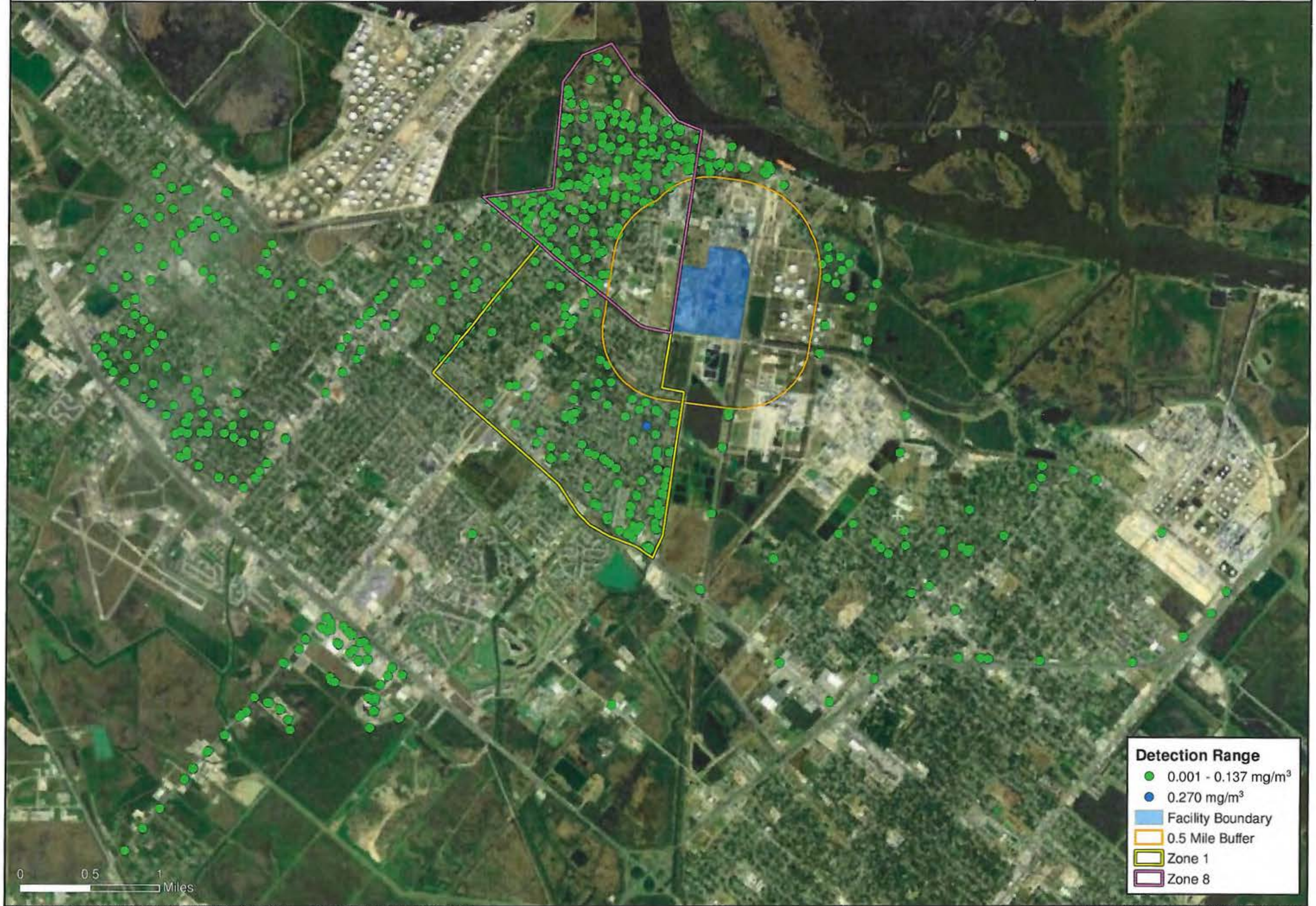
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *12/18/2019 5:45:50 PM*

CTEH

Handheld Real-Time Community Monitoring Locations ($PM_{2.5}$)

South 4 Group Fire | Port Neches, TX | 12/8/2019 06:00 - 12/18/2019 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

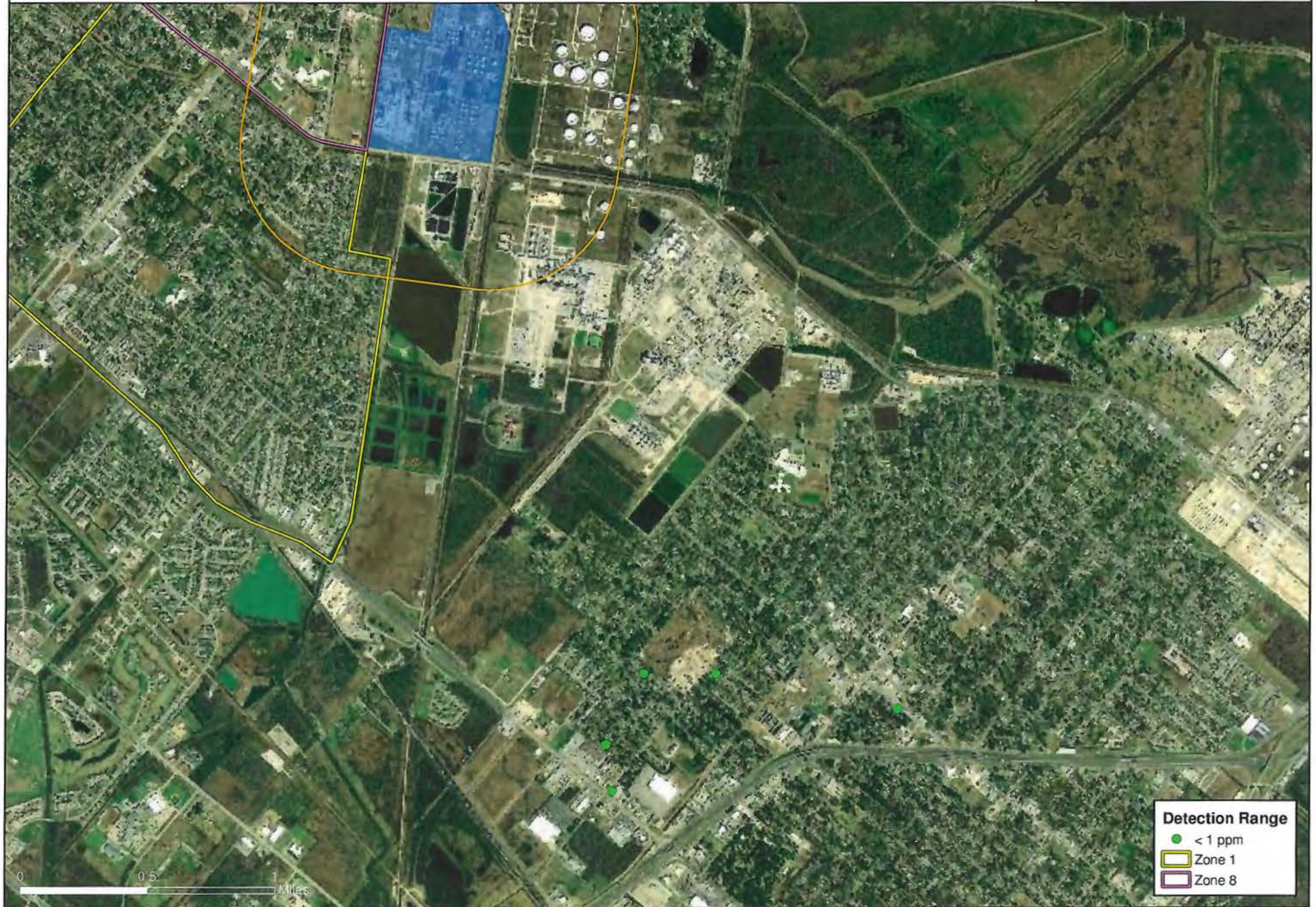


COORDINATE SYSTEM: NAD 1983 UTM Zone 15N DATUM: North American 1983 LAST UPDATED: 12/18/2019 4:52:22 PM

Handheld Real-Time Community Monitoring Locations (Styrene)

South 4 Group Fire I Port Neches, TX | 12/8/2019 06:00 - 12/18/2019 06:00 CST

Project: 112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: NAD 1983 UTM Zone 15N DATUM: North American 1983

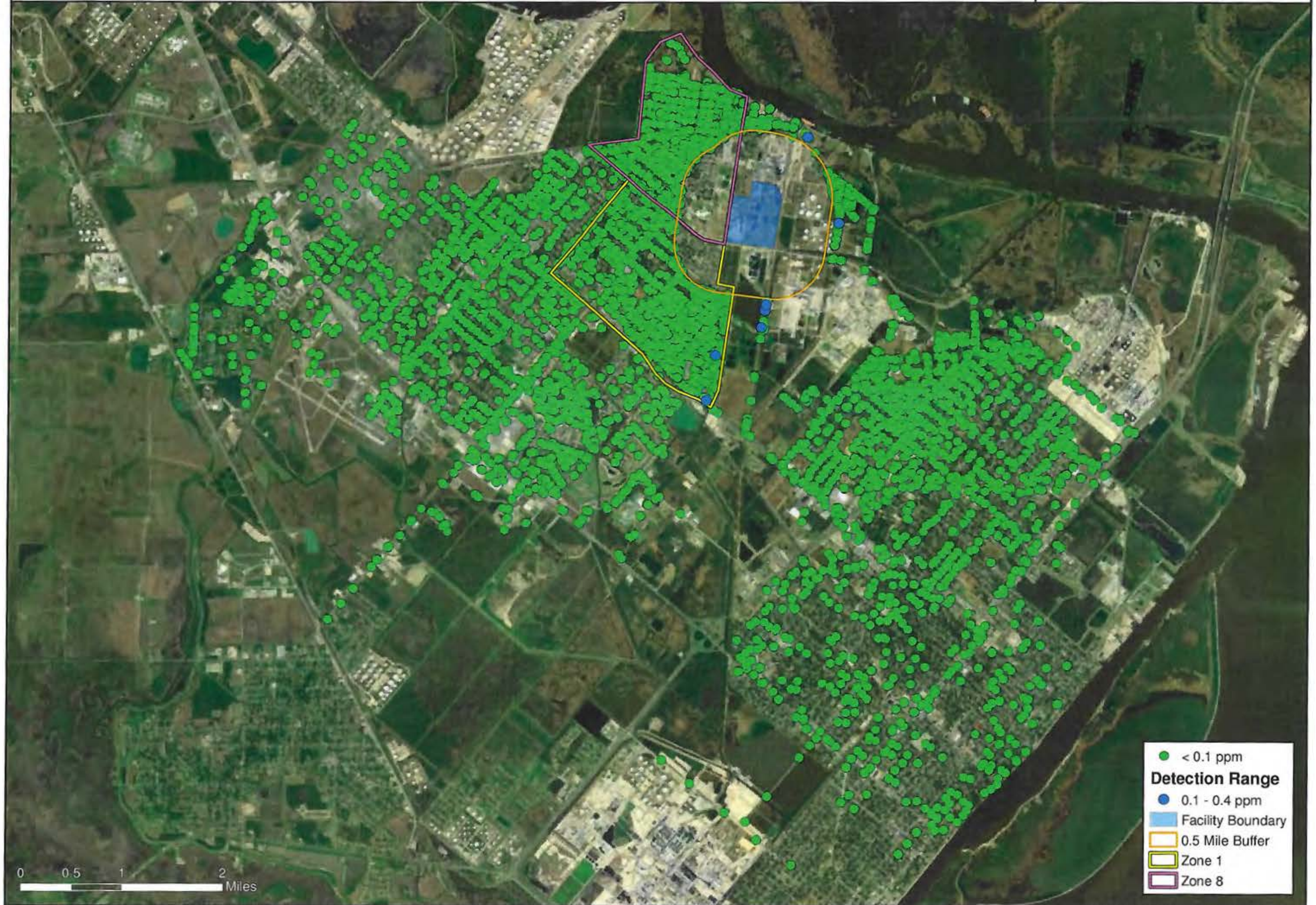
LAST UPDATED: 12/18/2019 5:49:09 PM

CTEH

Handheld Real-Time Community Monitoring Locations (VOCs)

South 4 Group Fire I Port Neches, TX | 12/8/2019 06:00 - 12/18/2019 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *12/18/2019 5:53:23 PM*

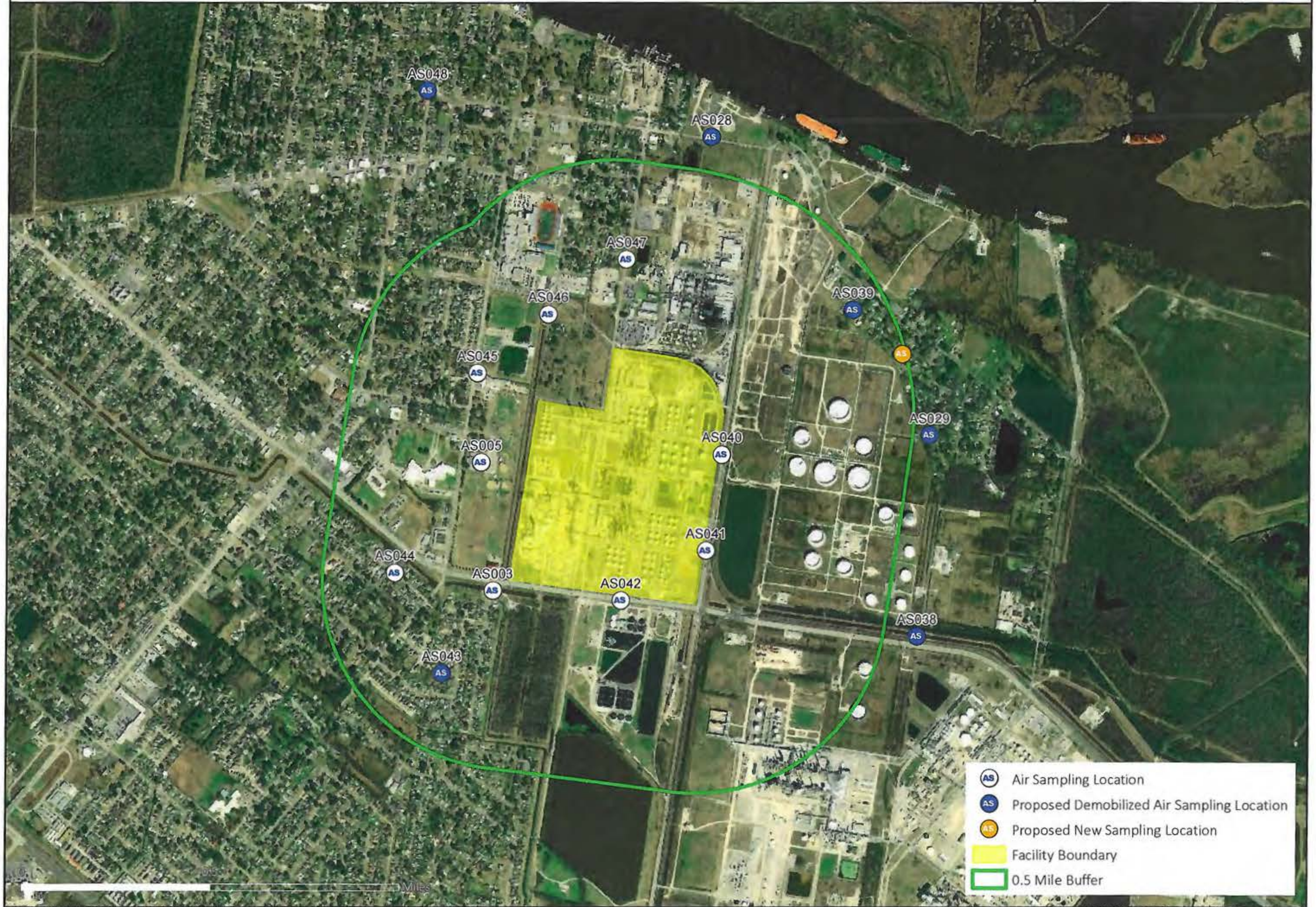
Attachment B

Preliminary Analytical Air Sampling Locations

Analytical Sampling Locations

South 4 Group Fire I Port Neches, TX | 12/19/2019

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *12/19/2019 8:04:24 AM*

Attachment C

Preliminary Analytical Data Summaries for VOCs

South 4 Group Fire

Compounds of Interest (TO-15) | Half Mile Reduction

Analytical Air Sampling Detection Summary by Location

L2 Verified Data as of 12/18/2019 4:25:15 PM

Location Code*	Analyte	Count of Samples	Count of Detections	Average of Detections (ppbv)	Detection Range
AS002	1,2,4-Trimethylbenzene	3	1	0.072	0.0722 - 0.0722 ppbv
	1,3-Butadiene	3	2	4.330	1.5 - 7.16 ppbv
	Benzene	3	3	0.202	0.133 - 0.252 ppbv
	Butane	3	3	2.793	2.11 - 3.94 ppbv
	m&p-Xylene	3	3	0.153	0.11 - 0.181 ppbv
	o-Xylene	3	2	0.080	0.0767 - 0.0826 ppbv
AS004	1,3-Butadiene	3	1	0.129	0.129 - 0.129 ppbv
	Benzene	3	3	0.202	0.132 - 0.316 ppbv
	Butane	3	3	1.793	1.37 - 2.37 ppbv
	m&p-Xylene	3	3	0.159	0.137 - 0.175 ppbv
	o-Xylene	3	2	0.076	0.0726 - 0.0797 ppbv
AS006	Benzene	3	3	0.231	0.118 - 0.389 ppbv
	Butane	3	3	1.690	1.23 - 2.09 ppbv
	m&p-Xylene	3	1	0.170	0.17 - 0.17 ppbv
	o-Xylene	3	1	0.086	0.0862 - 0.0862 ppbv
AS021	Benzene	3	3	0.196	0.159 - 0.26 ppbv
	Butane	3	3	1.733	1.18 - 2.25 ppbv
	m&p-Xylene	3	2	0.116	0.102 - 0.129 ppbv
	o-Xylene	3	1	0.070	0.0701 - 0.0701 ppbv
AS022	Benzene	3	3	0.568	0.106 - 1.08 ppbv
	Butane	3	3	1.722	0.646 - 2.73 ppbv
	Ethylbenzene	3	1	0.092	0.0923 - 0.0923 ppbv
	m&p-Xylene	3	3	0.140	0.1 - 0.205 ppbv
	o-Xylene	3	2	0.095	0.0648 - 0.126 ppbv
AS024	1,2,4-Trimethylbenzene	3	3	0.073	0.0623 - 0.0815 ppbv
	1,3-Butadiene	3	2	1.654	0.827 - 2.48 ppbv
	Benzene	3	3	0.221	0.119 - 0.336 ppbv
	Butane	3	3	2.360	1.85 - 2.7 ppbv
	MTBE	3	1	0.605	0.605 - 0.605 ppbv
	m&p-Xylene	3	3	0.138	0.104 - 0.171 ppbv
	o-Xylene	3	2	0.072	0.0717 - 0.0727 ppbv
AS028	1,2,4-Trimethylbenzene	6	3	0.094	0.078 - 0.121 ppbv
	1,3-Butadiene	6	6	2.758	0.183 - 6.71 ppbv
	Benzene	6	6	0.258	0.113 - 0.385 ppbv
	Butane	6	6	3.194	0.826 - 4.65 ppbv
	Ethylbenzene	6	3	0.114	0.107 - 0.118 ppbv
	MTBE	6	4	1.186	0.229 - 2.54 ppbv
	m&p-Xylene	6	5	0.177	0.117 - 0.342 ppbv
	o-Xylene	6	3	0.100	0.0843 - 0.129 ppbv
AS029	1,2,4-Trimethylbenzene	6	1	0.060	0.0603 - 0.0603 ppbv
	1,3-Butadiene	6	1	0.315	0.315 - 0.315 ppbv
	Benzene	6	6	0.429	0.119 - 0.819 ppbv

South 4 Group Fire

Compounds of Interest (TO-15) | Half Mile Reduction

Analytical Air Sampling Detection Summary by Location

L2 Verified Data as of 12/18/2019 4:25:15 PM

Location Code*	Analyte	Count of Samples	Count of Detections	Average of Detections (ppbv)	Detection Range
AS029	Butane	6	6	2.763	1.32 - 4.17 ppbv
	MTBE	6	2	0.629	0.333 - 0.925 ppbv
	m&p-Xylene	6	4	0.142	0.115 - 0.184 ppbv
	o-Xylene	6	3	0.071	0.0689 - 0.0732 ppbv
AS038	1,2,4-Trimethylbenzene	3	1	0.087	0.0865 - 0.0865 ppbv
	1,3-Butadiene	3	1	0.309	0.309 - 0.309 ppbv
	Benzene	3	3	0.644	0.18 - 1.35 ppbv
	Butane	3	3	3.433	1.81 - 4.51 ppbv
	Ethylbenzene	3	1	0.067	0.0665 - 0.0665 ppbv
	MTBE	3	1	0.089	0.0888 - 0.0888 ppbv
	m&p-Xylene	3	2	0.151	0.108 - 0.194 ppbv
	o-Xylene	3	1	0.104	0.104 - 0.104 ppbv
AS039	1,2,4-Trimethylbenzene	3	1	0.061	0.061 - 0.061 ppbv
	1,3-Butadiene	3	1	0.489	0.489 - 0.489 ppbv
	Benzene	3	3	0.565	0.37 - 0.846 ppbv
	Butane	3	3	3.663	1.89 - 5.3 ppbv
	m&p-Xylene	3	3	0.138	0.107 - 0.154 ppbv
	o-Xylene	3	2	0.074	0.0704 - 0.0781 ppbv
AS043	1,2,4-Trimethylbenzene	3	2	0.068	0.0625 - 0.0739 ppbv
	1,3-Butadiene	3	2	14.650	13.6 - 15.7 ppbv
	Benzene	3	3	0.285	0.219 - 0.321 ppbv
	Butane	3	3	7.280	5.17 - 8.66 ppbv
	Ethylbenzene	3	3	0.069	0.066 - 0.0724 ppbv
	MTBE	3	2	0.550	0.481 - 0.618 ppbv
	m&p-Xylene	3	3	0.156	0.131 - 0.175 ppbv
	o-Xylene	3	2	0.076	0.0754 - 0.0773 ppbv
AS048	1,2,4-Trimethylbenzene	3	2	0.078	0.074 - 0.0816 ppbv
	1,3-Butadiene	3	2	3.305	1.94 - 4.67 ppbv
	Benzene	3	3	0.291	0.204 - 0.423 ppbv
	Butane	3	3	3.700	3.16 - 4.49 ppbv
	Ethylbenzene	3	2	0.062	0.0603 - 0.0628 ppbv
	MTBE	3	2	0.970	0.8 - 1.14 ppbv
	Naphthalene	3	1	0.155	0.155 - 0.155 ppbv
	m&p-Xylene	3	3	0.151	0.109 - 0.178 ppbv
	o-Xylene	3	2	0.094	0.0847 - 0.103 ppbv

*AS002, AS004, AS006, AS021, AS022, and AS024 were discontinued and relocated following the reduction plan approved by UC on December 11, 2019.

Attachment D

Preliminary Asbestos Analytical Data Summary

Preliminary Integrated Air Sampling Laboratory Results | Fiber/Asbestos (Half Mile Reduction)

South 4 Group Fire | Data as of 12/19/2019 8:21:08 AM

Pending TEM Analysis
TEM Non-detection

Location Code*	Location Description	Sampling Date	Sample Number	Sample Volume (L)	PCM Sample Concentration (f/cc)[1]	TEM Sample Concentration (f/cc)[2]
AS002	On fence next to light post across from 306 Gist Dr.	12/8/2019	PNTX1207AB002N	661.98	<0.004	<0.0041
			PNTX1208AB002	706.3	<0.004	<0.0038
			PNTX1208AB002N	688.1	<0.004	<0.0039
		12/9/2019	PNTX1209AB002	744.3	<0.004	<0.0036
		12/10/2019	PNTX1209AB002N	831.8	<0.003	<0.0032
			PNTX1210AB002	1028.9	<0.003	<0.0026
		12/11/2019	PNTX1210AB002N	728.9	<0.004	<0.0037
AS004	Light post in front of 820 Baker Ave.	12/8/2019	PNTX1207AB004N	675.53	<0.004	<0.0040
			PNTX1208AB004	699.8	<0.004	<0.0039
			PNTX1208AB004N	714.8	<0.004	<0.0038
		12/9/2019	PNTX1209AB004	746.9	<0.004	<0.0036
		12/10/2019	PNTX1209AB004N	745.8	<0.004	<0.0036
			PNTX1210AB004	789.2	<0.003	<0.0034
AS006	On fence corner near entrance to Ridgewood Elementary and Bella Vita St.	12/8/2019	PNTX1207AB006N	666.43	<0.004	<0.0040
			PNTX1208AB006	705.3	<0.004	<0.0038
			PNTX1208AB006N	695.6	<0.004	<0.0039
		12/9/2019	PNTX1209AB006	756.9	<0.004	<0.0036
		12/10/2019	PNTX1209AB006N	756.9	<0.004	<0.0036
			PNTX1210AB006	678.1	<0.004	<0.004
		12/11/2019	PNTX1210AB006N	814.9	<0.003	<0.0033
AS021	Dieu St. - corner of Entergy substation fence	12/8/2019	PNTX1207AB021N	657.21	<0.004	<0.0041
			PNTX1208AB021	711.8	<0.004	<0.0038
			PNTX1208AB021N	725.9	<0.004	<0.0037
		12/9/2019	PNTX1209AB021	732.8	<0.004	<0.0037
		12/10/2019	PNTX1209AB021N	777.3	<0.003	<0.0035
			PNTX1210AB021	724.5	<0.004	<0.0037
		12/11/2019	PNTX1210AB021N	777.5	<0.003	<0.0035
AS022	Orchard Ave. fence - north side of Atlantic Canal	12/8/2019	PNTX1208AB022	681.2	<0.004	<0.0040
			PNTX1208AB022N	766.7	<0.004	<0.0035
		12/9/2019	PNTX1209AB022	708.5	<0.004	<0.0038
			PNTX1209AB022N	758.1	<0.004	<0.0036
		12/10/2019	PNTX1210AB022	718.7	<0.004	<0.0038
			PNTX1210AB022N	779.4	<0.003	<0.0035
AS024	Grigsby Ave. and Montgomery St. - telephone pole	12/8/2019	PNTX1207AB024N	648.42	<0.004	<0.0042
			PNTX1207AB024ND	661.82	<0.004	<0.0041
			PNTX1208AB024	694.7	<0.004	<0.0039
			PNTX1208AB024N	730.5	<0.004	<0.0037
		12/9/2019	PNTX1209AB024	744	<0.004	<0.0036
		12/10/2019	PNTX1210AB024	718.4	<0.004	<0.0038
		12/11/2019	PNTX1210AB024N	753.7	<0.004	<0.0036
AS028	TPC Port Neches dock entrance road	12/8/2019	PNTX1207AB028N	657.98	<0.004	<0.0041
			PNTX1208AB028	711.2	<0.004	<0.0038
			PNTX1208AB028D	718.9	<0.004	<0.0038
			PNTX1208AB028N	728.2	<0.004	<0.0037
		12/9/2019	PNTX1209AB028	737.9	<0.004	<0.0037
		12/10/2019	PNTX1209AB028N	765.3	<0.004	<0.0035
			PNTX1210AB028	719.6	<0.004	<0.0038
		12/11/2019	PNTX1210AB028N	767.1	<0.004	<0.0035
			PNTX1211AB028	704.2	<0.004	Pending Analysis
		12/12/2019	PNTX1211AB028N	794.9	<0.003	Pending Analysis
			PNTX1211AB028ND	691.9	<0.004	Pending Analysis
			PNTX1212AB028	723.8	<0.004	Pending Analysis

Non-detections are reported as less than ("<") the laboratory reporting limit.
[1]Total fiber concentration per cubic centimeter (f/cc) by Phase Contrast Microscopy (PCM), NIOSH method 7400.
[2]Asbestos fiber concentration per cubic centimeter (f/cc) by Transmission Electron Microscopy (TEM) NIOSH method 7402.

Preliminary Integrated Air Sampling Laboratory Results | Fiber/Asbestos (Half Mile Reduction)

South 4 Group Fire | Data as of 12/19/2019 8:21:08 AM

Pending TEM Analysis
TEM Non-detection

Location Code*	Location Description	Sampling Date	Sample Number	Sample Volume (L)	PCM Sample Concentration (f/cc)¹	TEM Sample Concentration (f/cc)²
AS028	TPC Port Neches dock entrance road	12/13/2019	PNTX1212AB028N	769.4	<0.004	Pending Analysis
			PNTX1213AB028	739.4	Not Analyzed	Pending Analysis
		12/14/2019	PNTX1213AB028N	721.1	<0.004	Pending Analysis
			PNTX1214AB028	734.8	<0.004	Pending Analysis
AS029	Corner of Sycamore St. and Pine St.	12/8/2019	PNTX1208AB029	677.9	<0.004	<0.0040
			PNTX1208AB029N	735.3	<0.004	<0.0037
			PNTX1208AB029ND	756.2	<0.004	<0.0036
		12/9/2019	PNTX1209AB029	711.1	<0.004	<0.0038
			PNTX1209AB029N	760.7	<0.004	<0.0035
		12/10/2019	PNTX1210AB029	711.5	<0.004	<0.0038
			PNTX1210AB029N	786.1	<0.003	<0.0034
		12/11/2019	PNTX1211AB029	699.9	<0.004	Pending Analysis
			PNTX1211AB029N	687.9	<0.004	Pending Analysis
		12/12/2019	PNTX1212AB029	693.5	<0.004	Pending Analysis
			PNTX1212AB029N	730.8	<0.004	Pending Analysis
		12/13/2019	PNTX1213AB029	713.3	<0.004	Pending Analysis
			PNTX1213AB029N	739	<0.004	Pending Analysis
		12/14/2019	PNTX1214AB029	708	<0.004	Pending Analysis
AS038	Fenceline across railroad tracks on the corner of HWY 366 and Pine St	12/11/2019	PNTX1211AB038	716.7	<0.004	Pending Analysis
			PNTX1211AB038N	668.2	<0.004	Pending Analysis
		12/12/2019	PNTX1212AB038	693.6	<0.004	Pending Analysis
			PNTX1212AB038N	773.2	<0.003	Pending Analysis
		12/13/2019	PNTX1213AB038	710.1	<0.004	Pending Analysis
			PNTX1213AB038N	745.8	<0.004	Pending Analysis
		12/14/2019	PNTX1214AB038	720.7	<0.004	Pending Analysis
			PNTX1214AB038D	724.6	<0.004	Pending Analysis
AS039	Fenceline across from the corner of Maple and Canal	12/11/2019	PNTX1211AB039	626.5	<0.004	Pending Analysis
			PNTX1211AB039N	696.8	<0.004	Pending Analysis
		12/12/2019	PNTX1212AB039	699.7	<0.004	Pending Analysis
			PNTX1212AB039N	695.6	0.0040	Pending Analysis
		12/13/2019	PNTX1213AB039	715.7	<0.004	Pending Analysis
			PNTX1213AB039N	733.2	0.0040	Pending Analysis
		12/14/2019	PNTX1214AB039	716.7	<0.004	Pending Analysis
AS043	Streetlamp at the cul-de-sac of Barbara Ct	12/11/2019	PNTX1211AB043	626.1	<0.004	Pending Analysis
		12/12/2019	PNTX1211AB043N	759.2	<0.004	Pending Analysis
			PNTX1212AB043	663.8	<0.004	Pending Analysis
		12/13/2019	PNTX1212AB043N	742.8	<0.004	Pending Analysis
			PNTX1213AB043	707.2	<0.004	Pending Analysis
		12/14/2019	PNTX1213AB043N	741.2	<0.004	Pending Analysis
			PNTX1214AB043	731.4	<0.004	Pending Analysis
AS048	Electric pole near the intersection of Dallas St. and Grigsby Ave	12/11/2019	PNTX1211AB048	692.8	<0.004	Pending Analysis
		12/12/2019	PNTX1211AB048N	713.5	<0.004	Pending Analysis
			PNTX1212AB048	689.1	<0.004	Pending Analysis
		12/13/2019	PNTX1212AB048N	775.8	<0.003	Pending Analysis
			PNTX1213AB048	729.4	<0.004	Pending Analysis
		12/14/2019	PNTX1213AB048N	721.7	<0.004	Pending Analysis
			PNTX1214AB048	731.6	<0.004	Pending Analysis

Non-detections are reported as less than ("<") the laboratory reporting limit.
¹Total fiber concentration per cubic centimeter (f/cc) by Phase Contrast Microscopy (PCM), NIOSH method 7400.
²Asbestos fiber concentration per cubic centimeter (f/cc) by Transmission Electron Microscopy (TEM) NIOSH method 7402.
*AS002, AS004, AS006, AS021, AS022, and AS024 were discontinued and relocated following the reduction plan approved by UC on December 11, 2019.

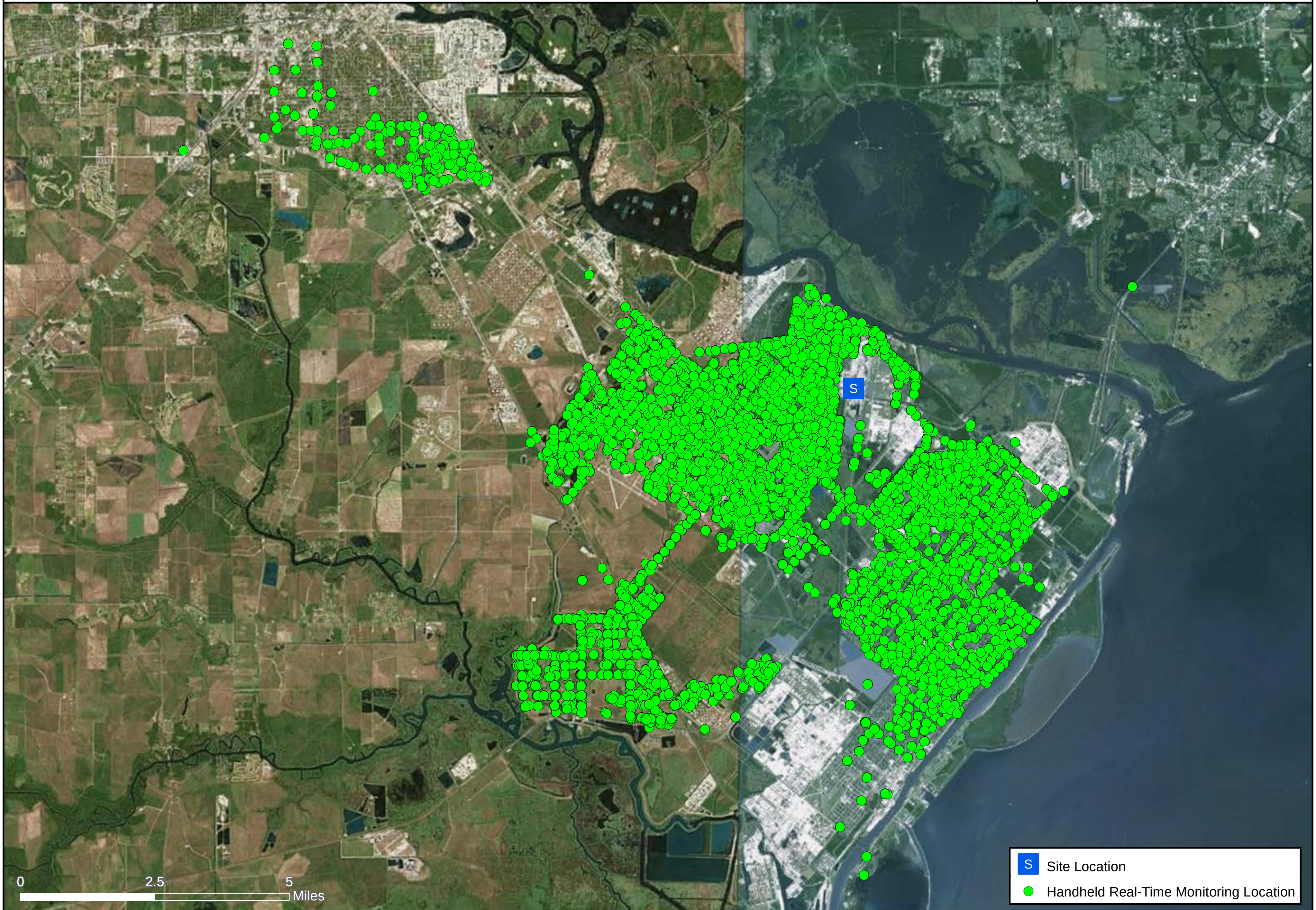
Appendix C

Handheld Real-Time Air Monitoring Locations

Handheld Real-Time Community Monitoring Locations

South 4 Group Fire l Port Neches, TX | 11/27/2019 09:42 - 12/4/2019 16:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



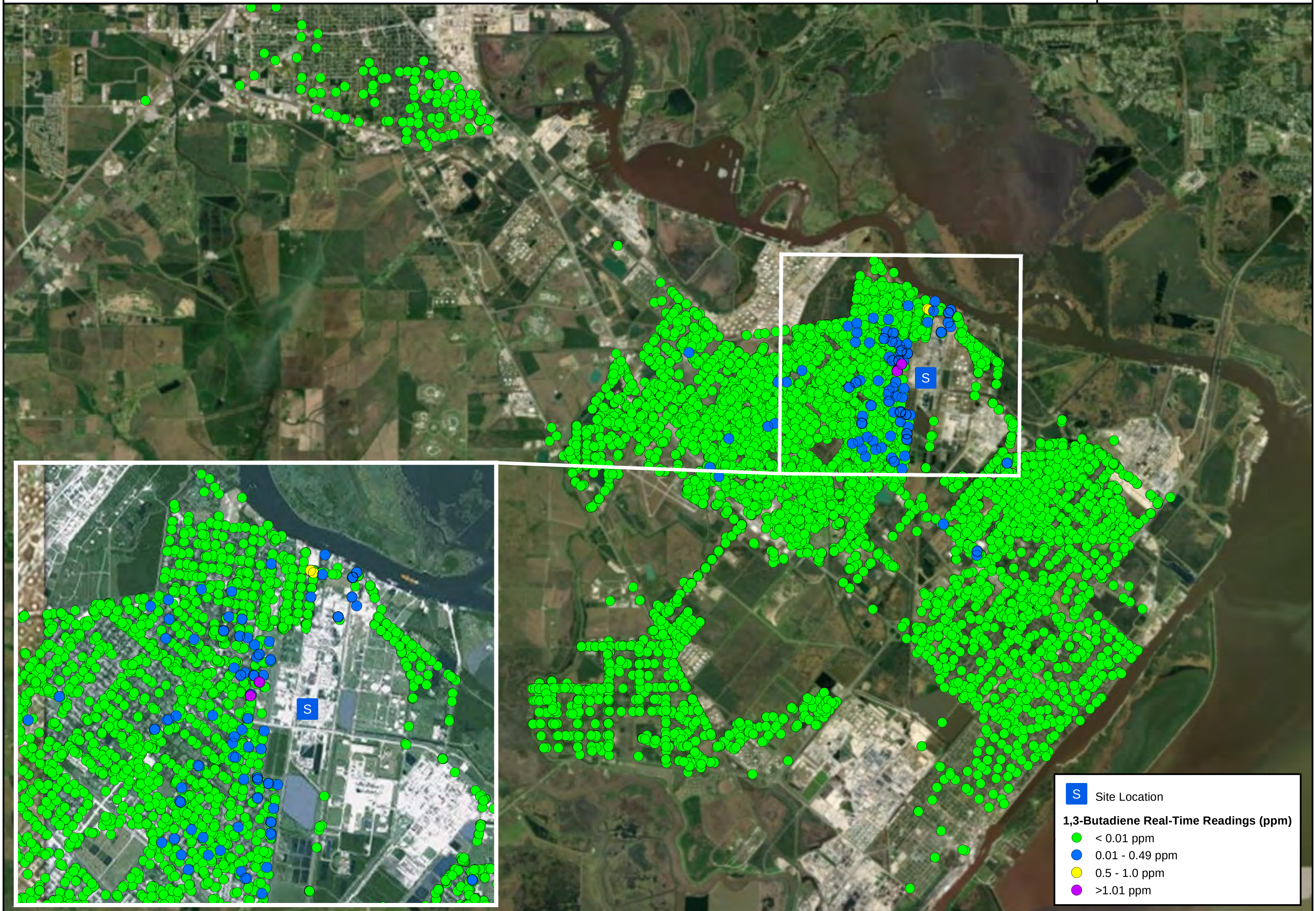
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 10:42:17 AM*

Handheld Real-Time Community Monitoring Locations (1,3-Butadiene)

South 4 Group Fire l Port Neches, TX | 11/27/2019 09:42 - 12/4/2019 16:00 CST

CTEH

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



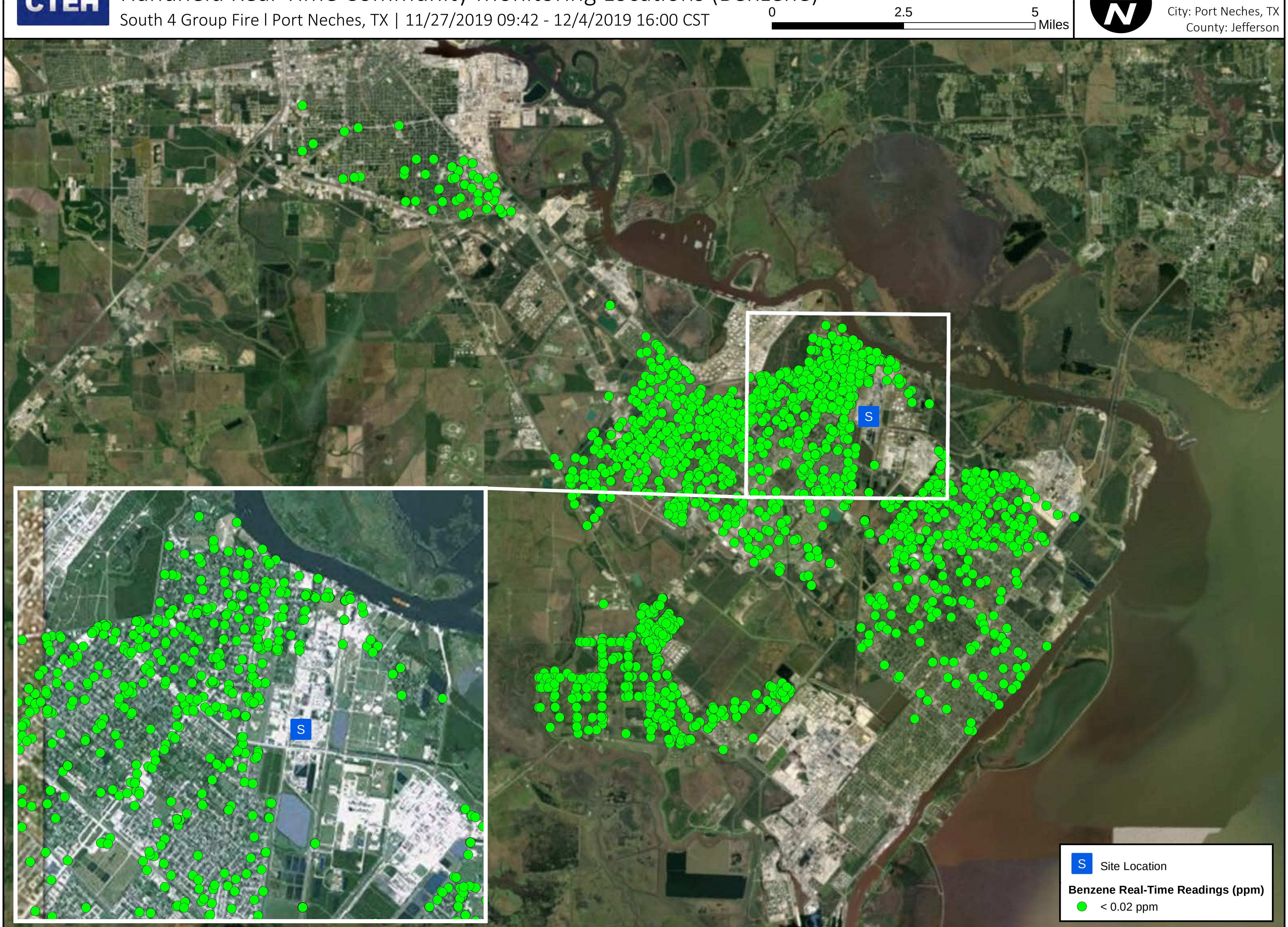
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 7:30:53 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (Benzene)

South 4 Group Fire | Port Neches, TX | 11/27/2019 09:42 - 12/4/2019 16:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

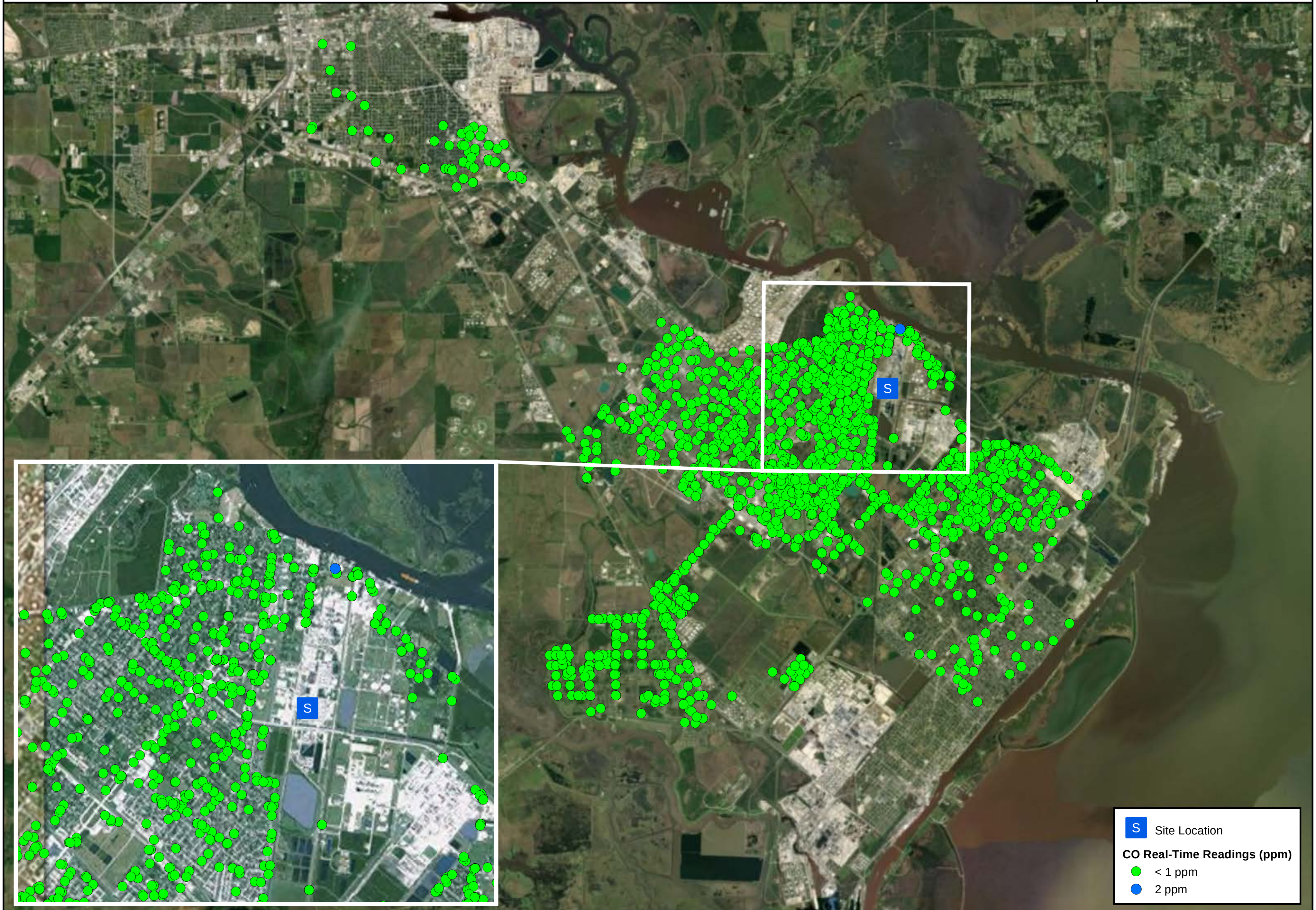


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 1:42:42 PM*

Handheld Real-Time Community Monitoring Locations (CO)

South 4 Group Fire l Port Neches, TX | 11/27/2019 09:42 - 12/4/2019 16:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

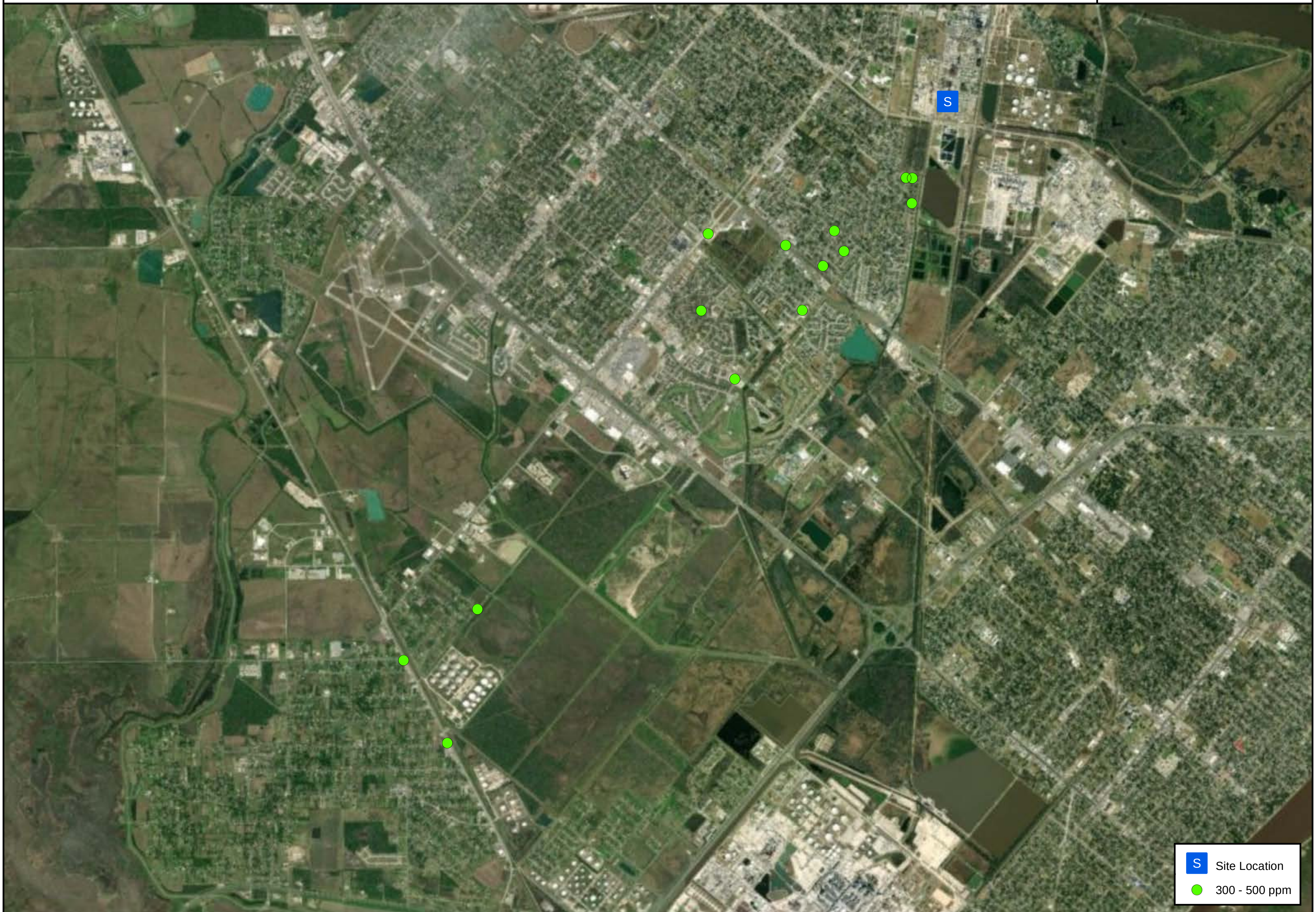


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 1:51:21 PM*

Handheld Real-Time Community Monitoring Locations (CO2)

South 4 Group Fire l Port Neches, TX | 11/27/2019 09:42 - 12/4/2019 16:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



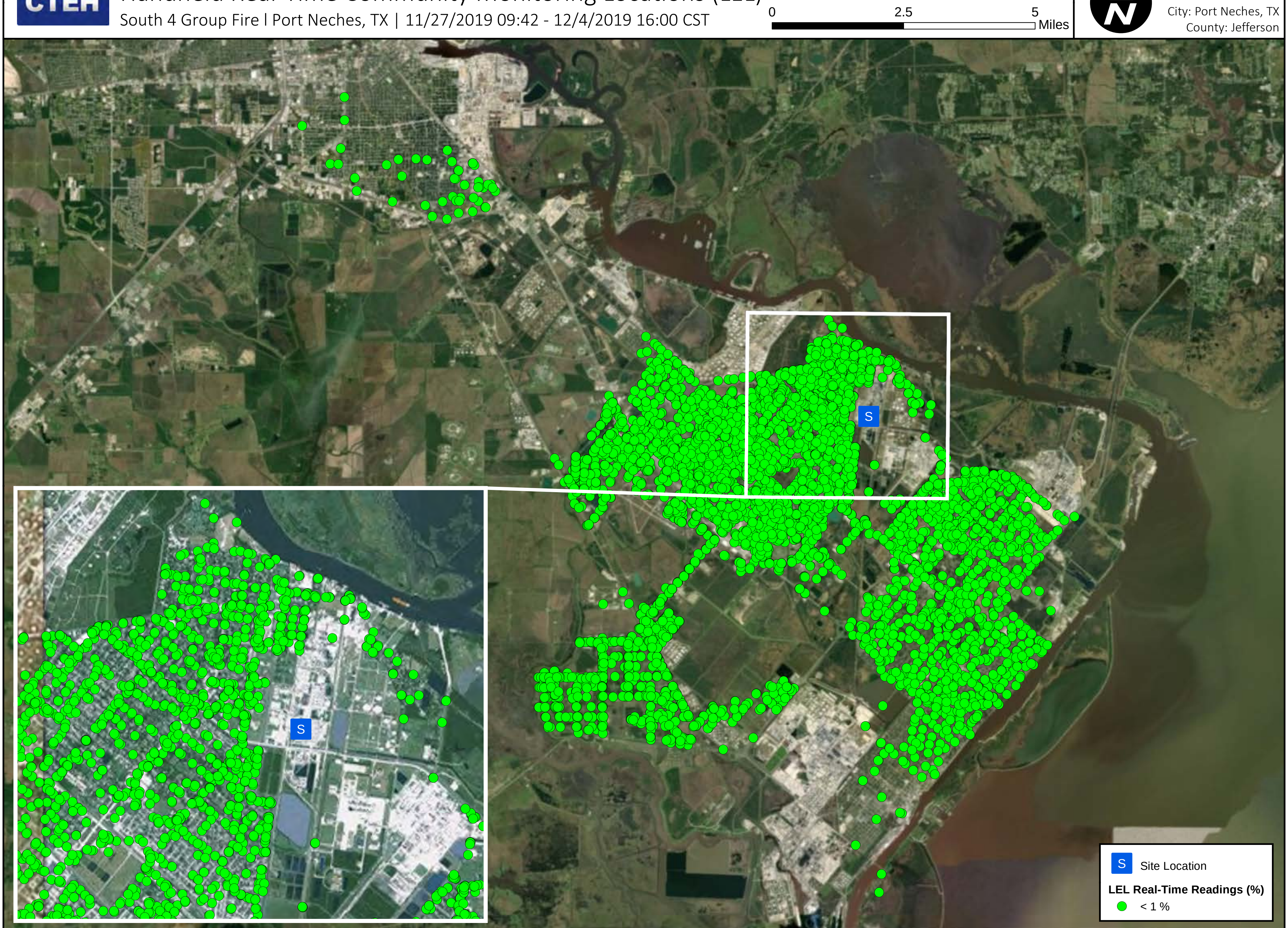
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 1:57:11 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (LEL)

South 4 Group Fire l Port Neches, TX | 11/27/2019 09:42 - 12/4/2019 16:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



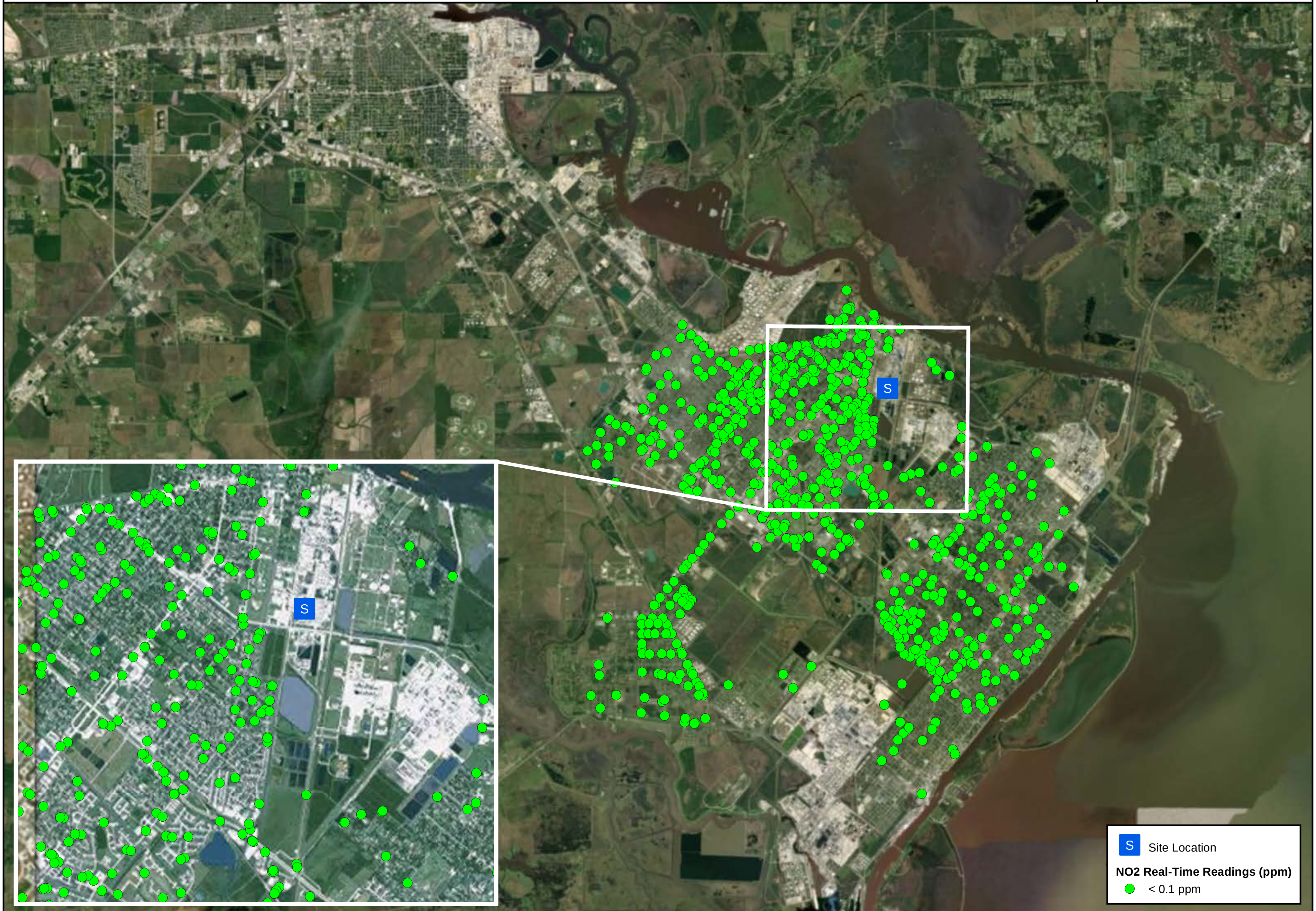
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 2:00:55 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (NO2)

South 4 Group Fire l Port Neches, TX | 11/27/2019 09:42 - 12/4/2019 16:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



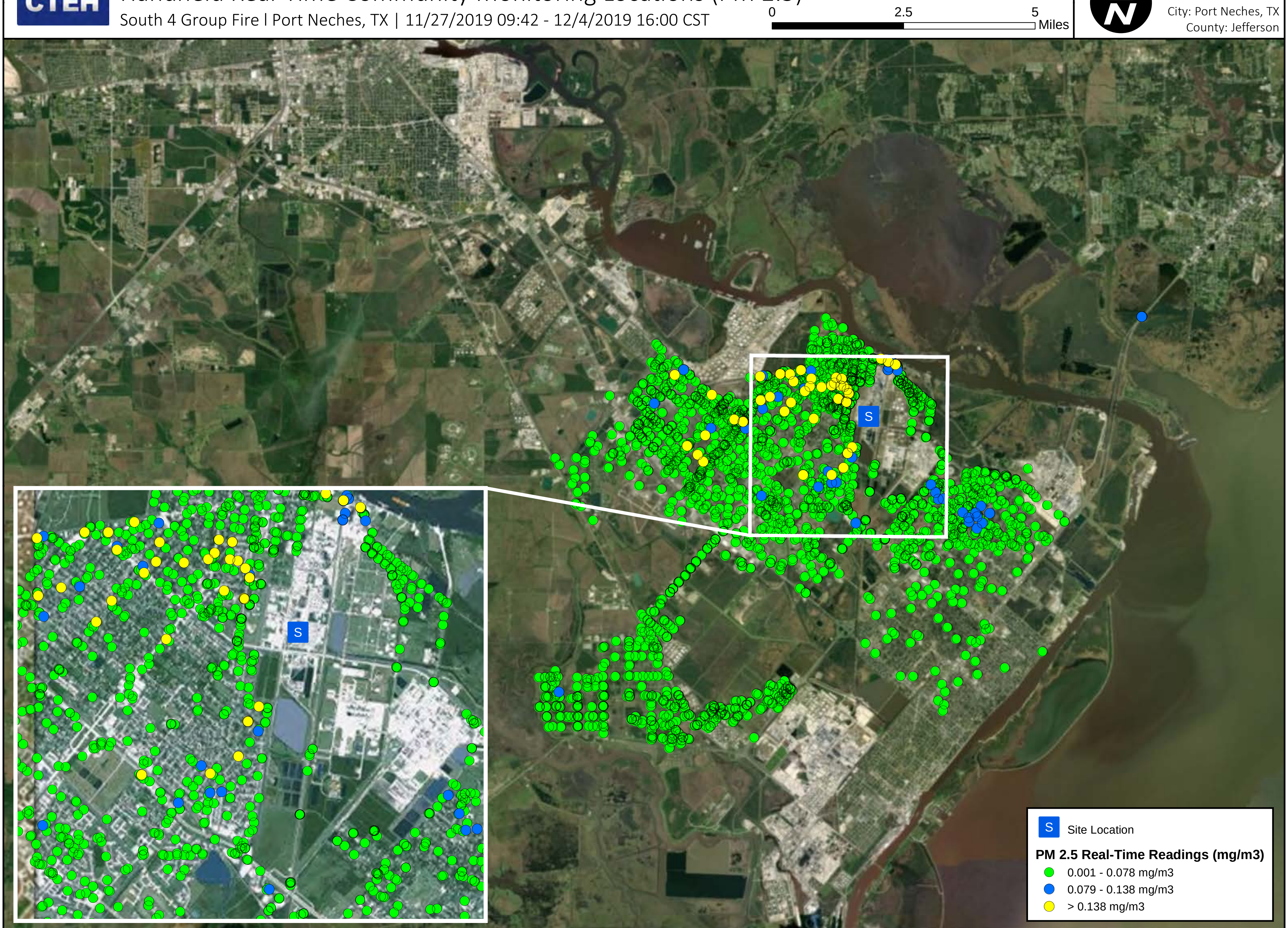
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 2:16:17 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (PM 2.5)

South 4 Group Fire l Port Neches, TX | 11/27/2019 09:42 - 12/4/2019 16:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

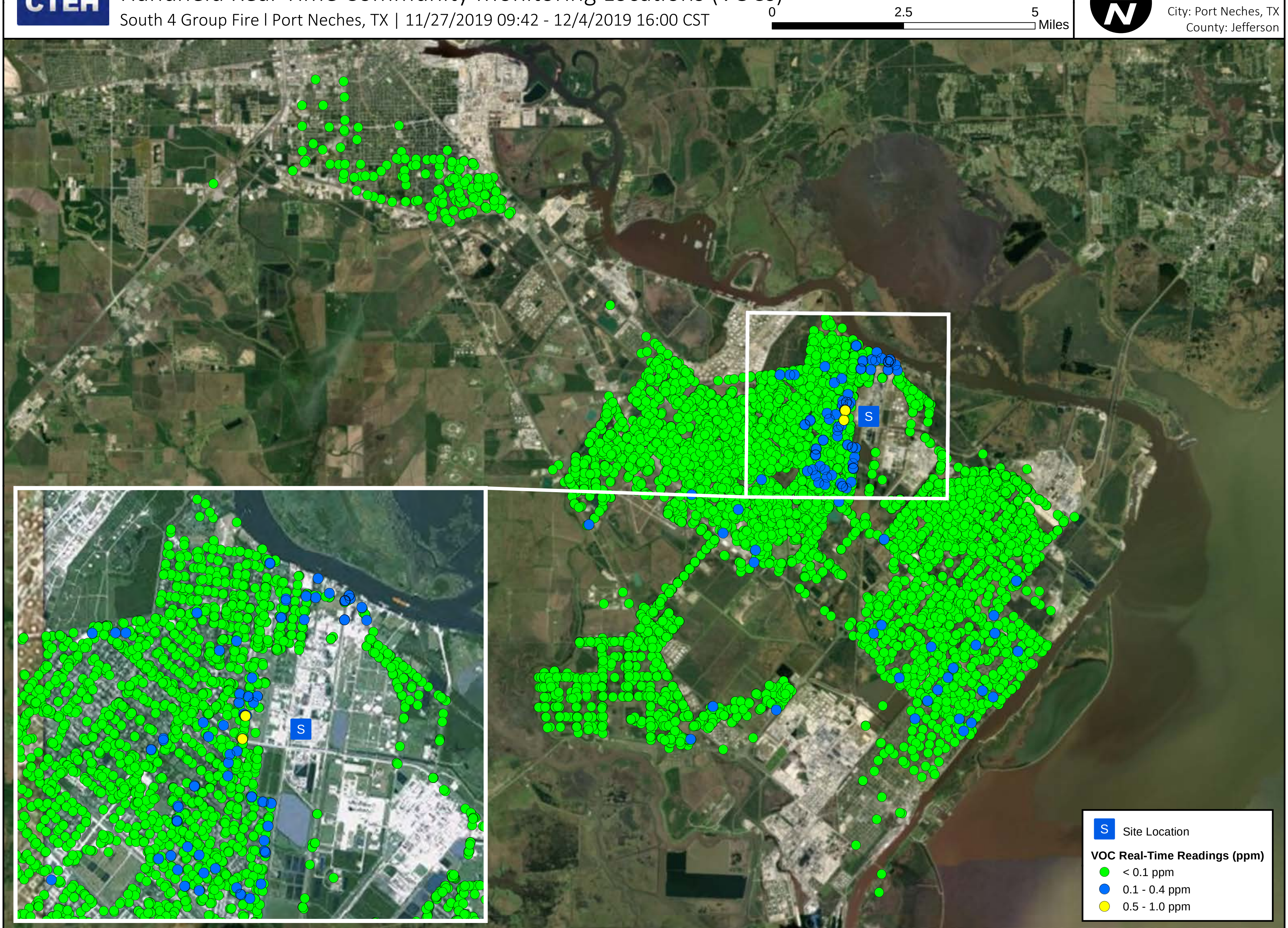


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 2:28:48 PM*

Handheld Real-Time Community Monitoring Locations (VOCs)

South 4 Group Fire l Port Neches, TX | 11/27/2019 09:42 - 12/4/2019 16:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



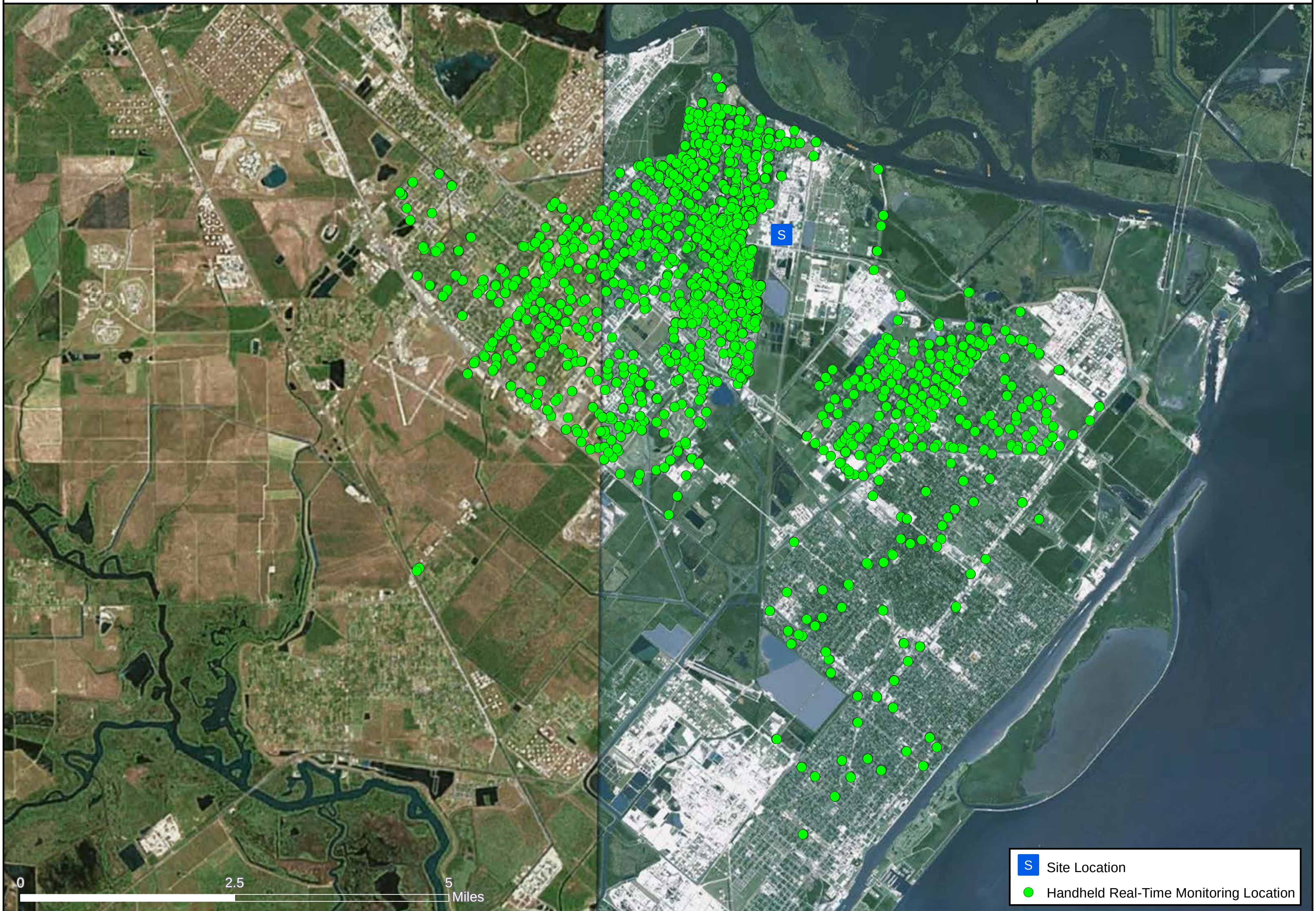
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 2:04:24 PM*

CTEH

Handheld Real-Time Community Monitoring Locations

South 4 Group Fire l Port Neches, TX | 12/4/2019 16:00 - 12/5/2019 14:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

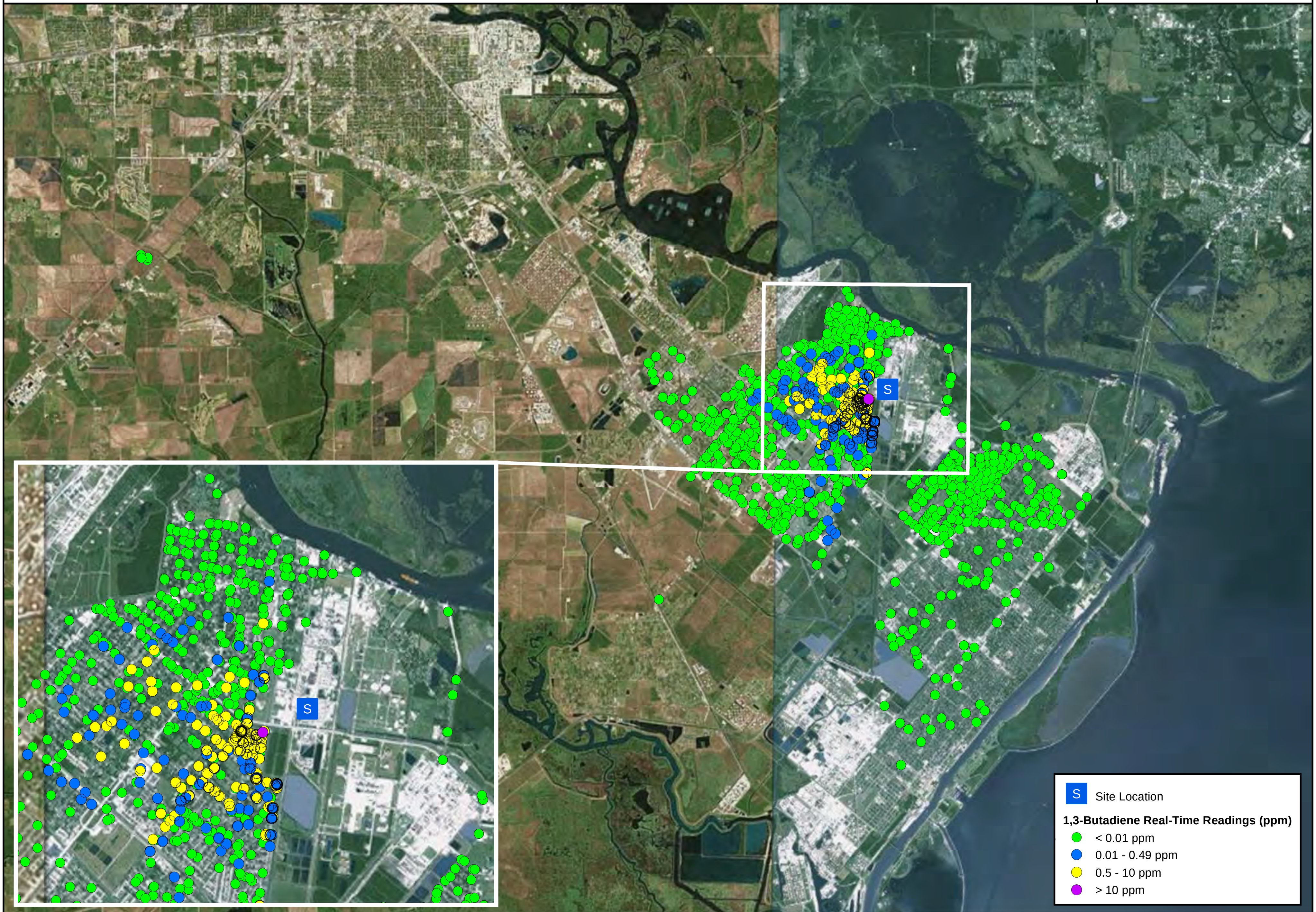


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 2:57:08 PM*

Handheld Real-Time Community Monitoring Locations (1,3-Butadiene)

South 4 Group Fire l Port Neches, TX | 12/4/2019 16:00 - 12/5/2019 14:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



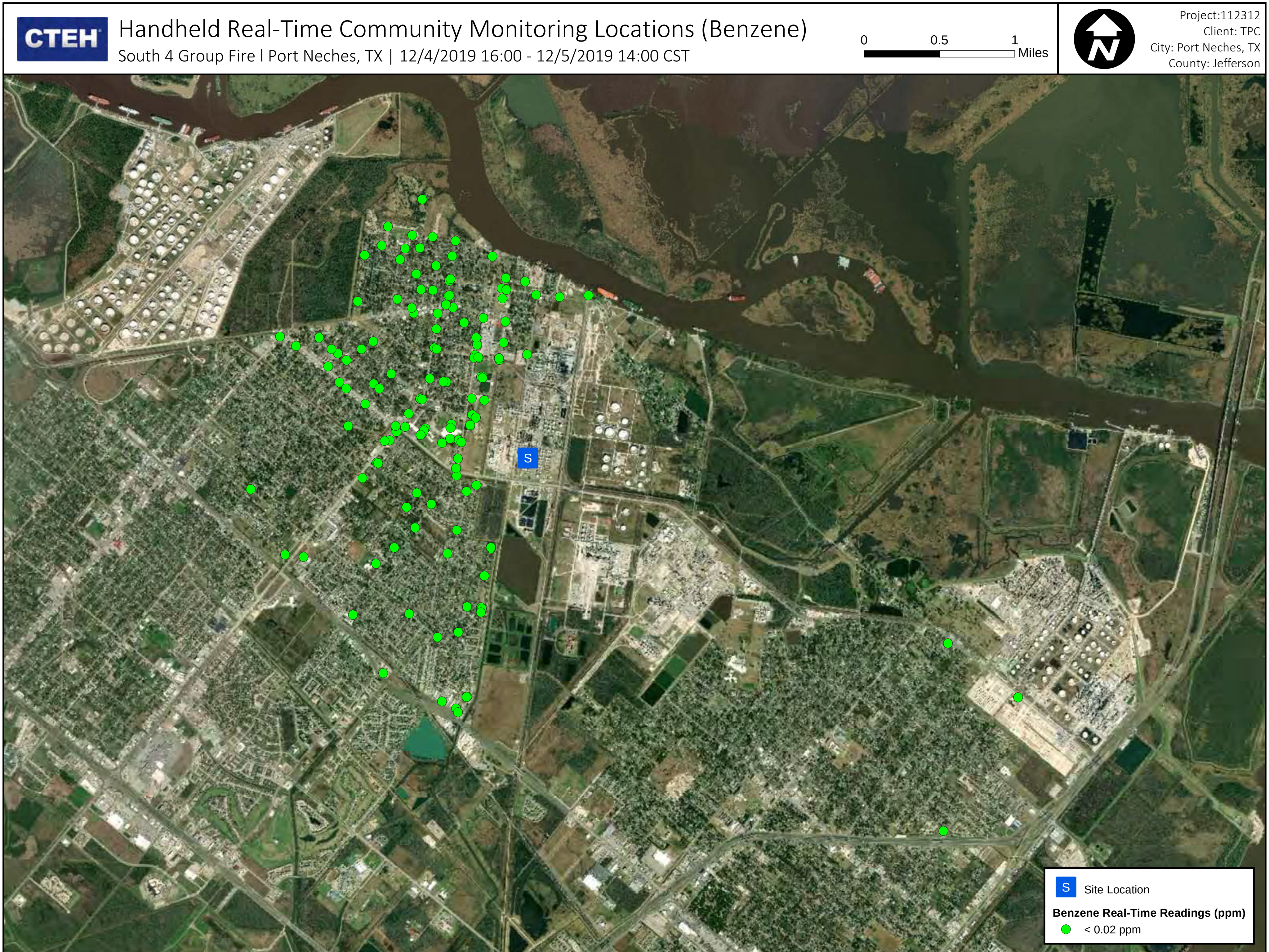
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/13/2020 3:08:28 PM*

CTEH

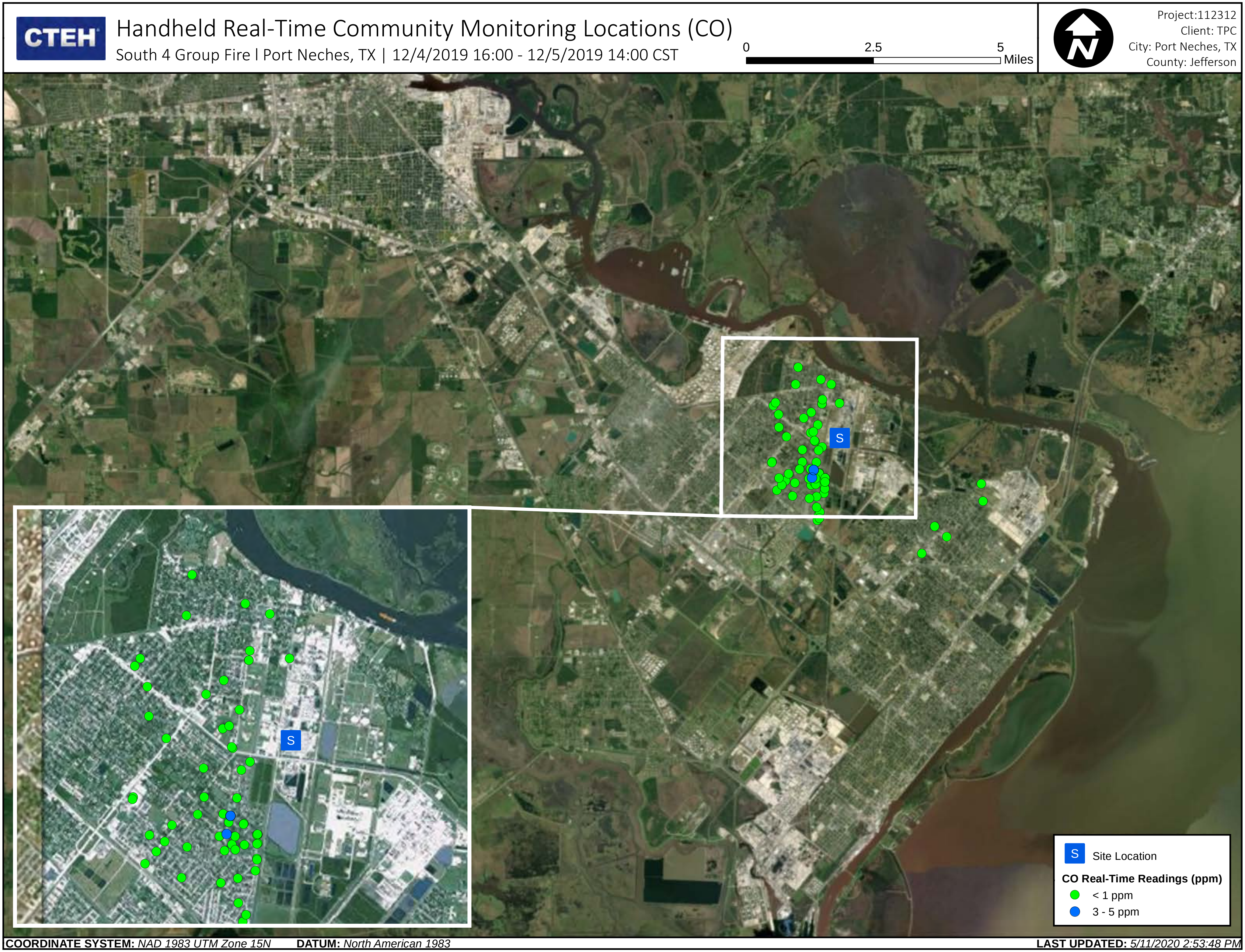
Handheld Real-Time Community Monitoring Locations (Benzene)

South 4 Group Fire l Port Neches, TX | 12/4/2019 16:00 - 12/5/2019 14:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 2:47:20 PM*

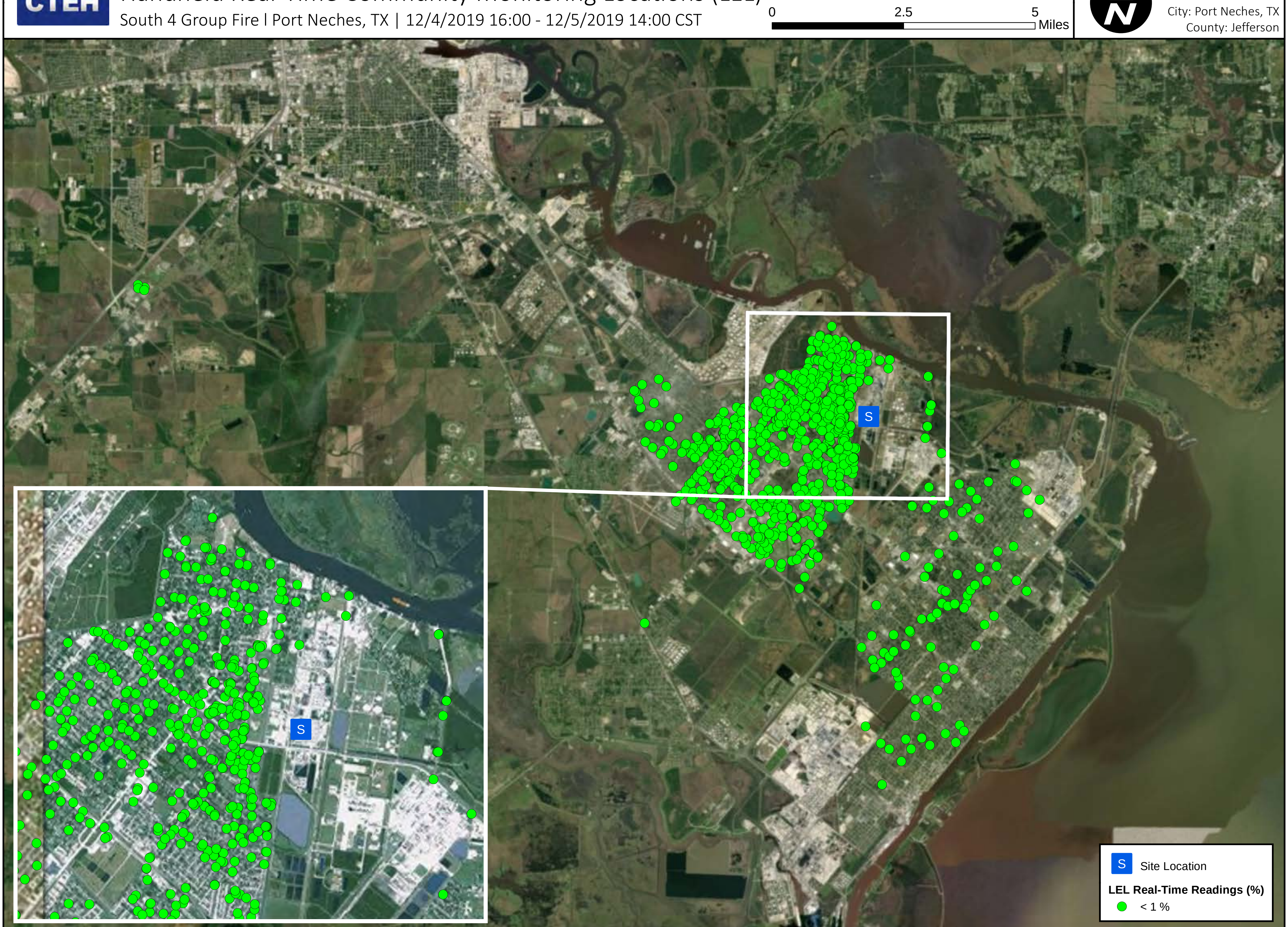


CTEH
Handheld Real-Time Community Monitoring Locations (CO)
South 4 Group Fire l Port Neches, TX | 12/4/2019 16:00 - 12/5/2019 14:00 CST
0
2.5
5
Miles
Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson
S
Site Location
CO Real-Time Readings (ppm)
< 1 ppm
3 - 5 ppm
COORDINATE SYSTEM: NAD 1983 UTM Zone 15N
DATUM: North American 1983
LAST UPDATED: 5/11/2020 2:53:48 PM

Handheld Real-Time Community Monitoring Locations (LEL)

South 4 Group Fire | Port Neches, TX | 12/4/2019 16:00 - 12/5/2019 14:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

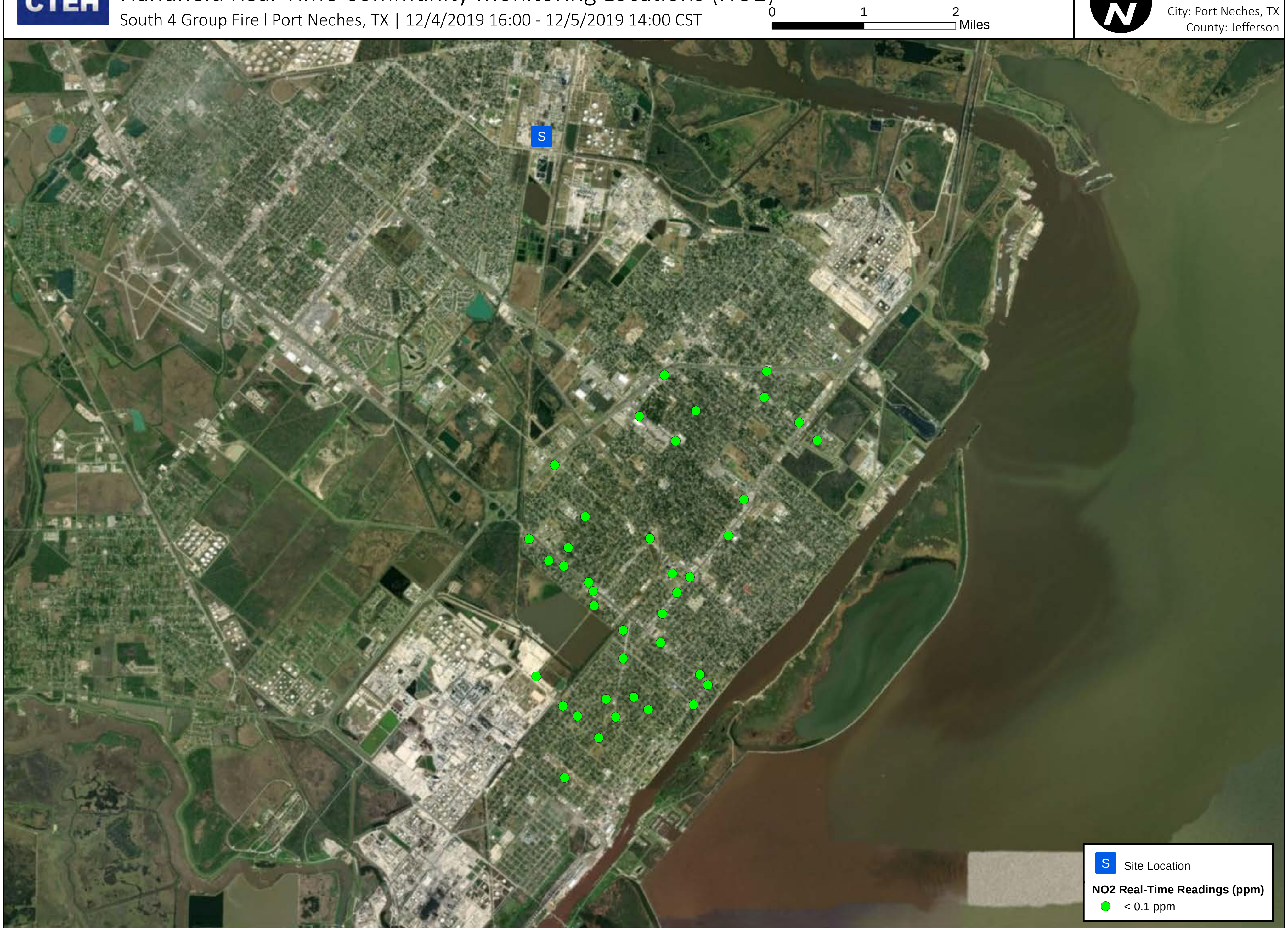


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 2:54:35 PM*

Handheld Real-Time Community Monitoring Locations (NO2)

South 4 Group Fire l Port Neches, TX | 12/4/2019 16:00 - 12/5/2019 14:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



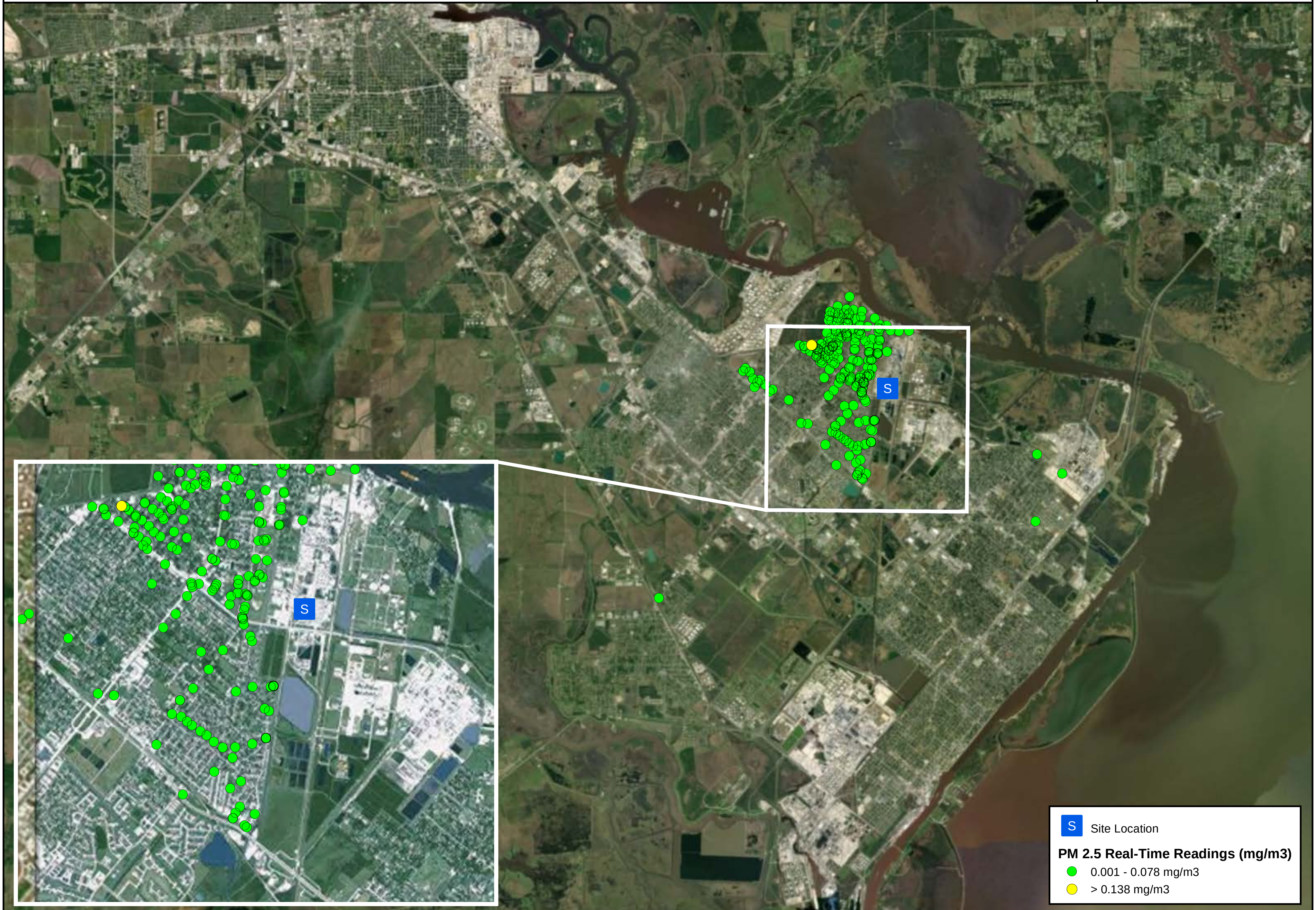
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 3:40:00 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (PM 2.5)

South 4 Group Fire l Port Neches, TX | 12/4/2019 16:00 - 12/5/2019 14:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 3:00:32 PM*

CTEH

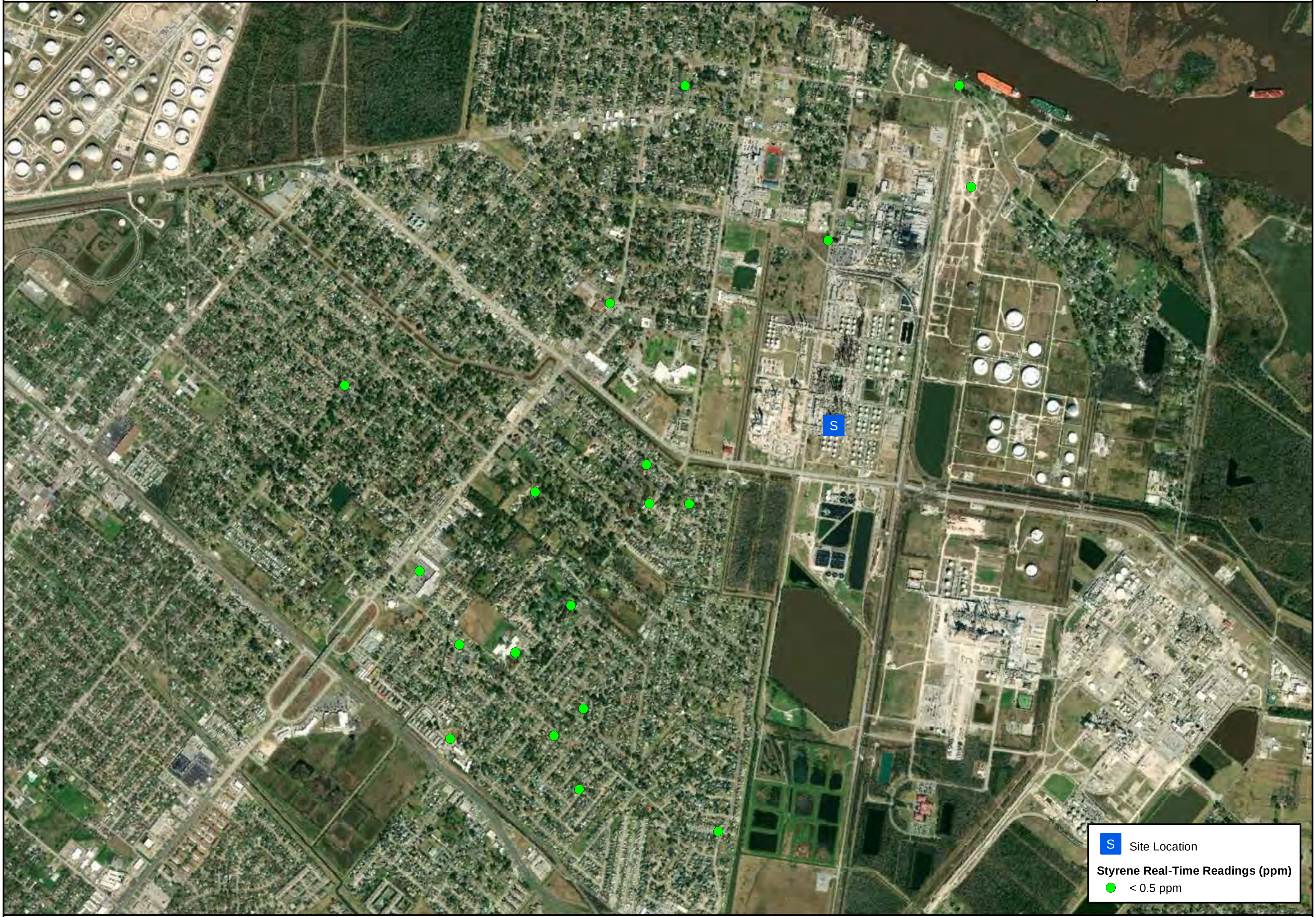
Handheld Real-Time Community Monitoring Locations (Styrene)

South 4 Group Fire l Port Neches, TX | 12/4/2019 16:00 - 12/5/2019 14:00 CST

0 0.5 1 Miles

N

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 3:05:35 PM*

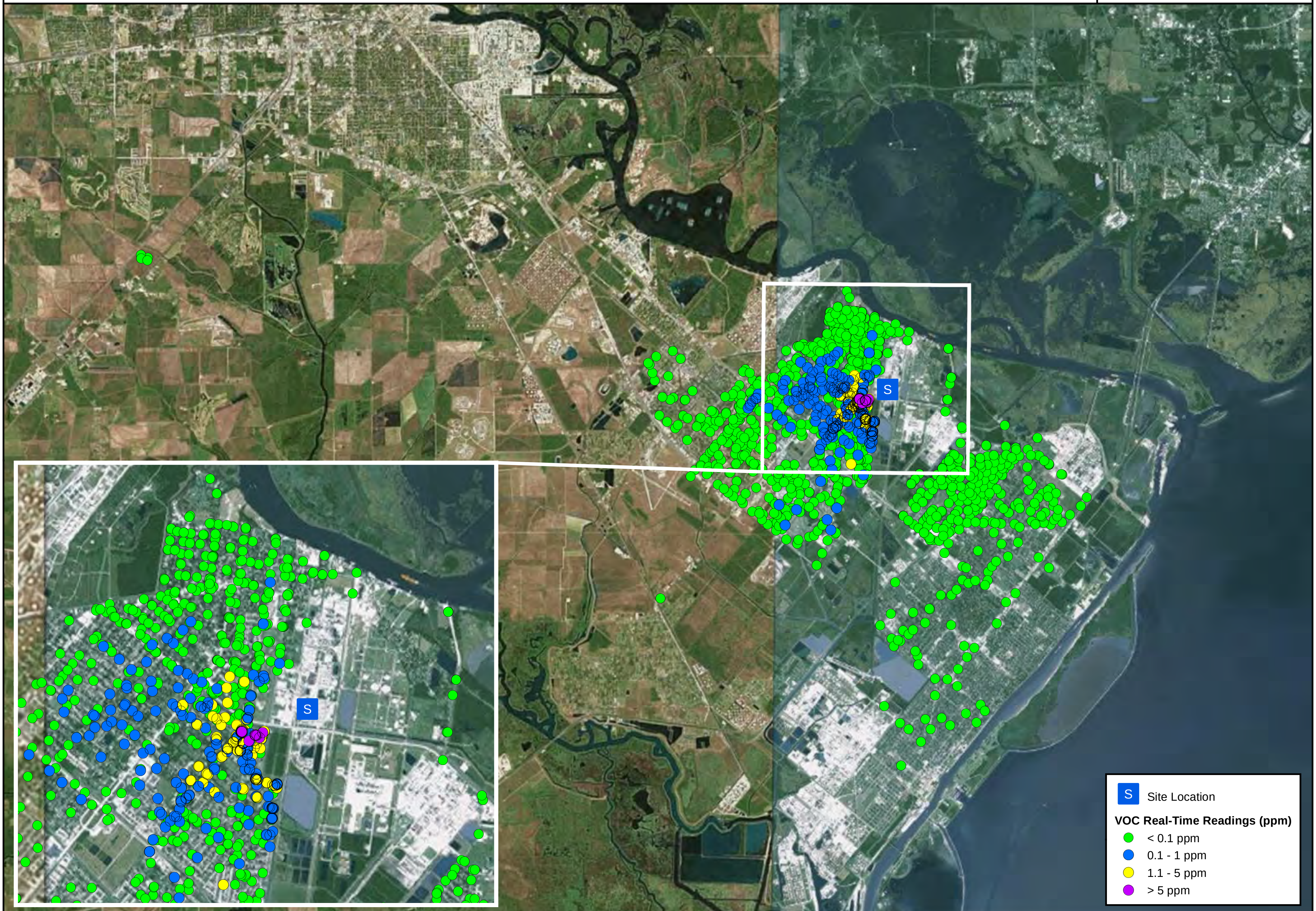
CTEH

Handheld Real-Time Community Monitoring Locations (VOCs)

South 4 Group Fire l Port Neches, TX | 12/4/2019 16:00 - 12/5/2019 14:00 CST

0 2.5 5 Miles

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

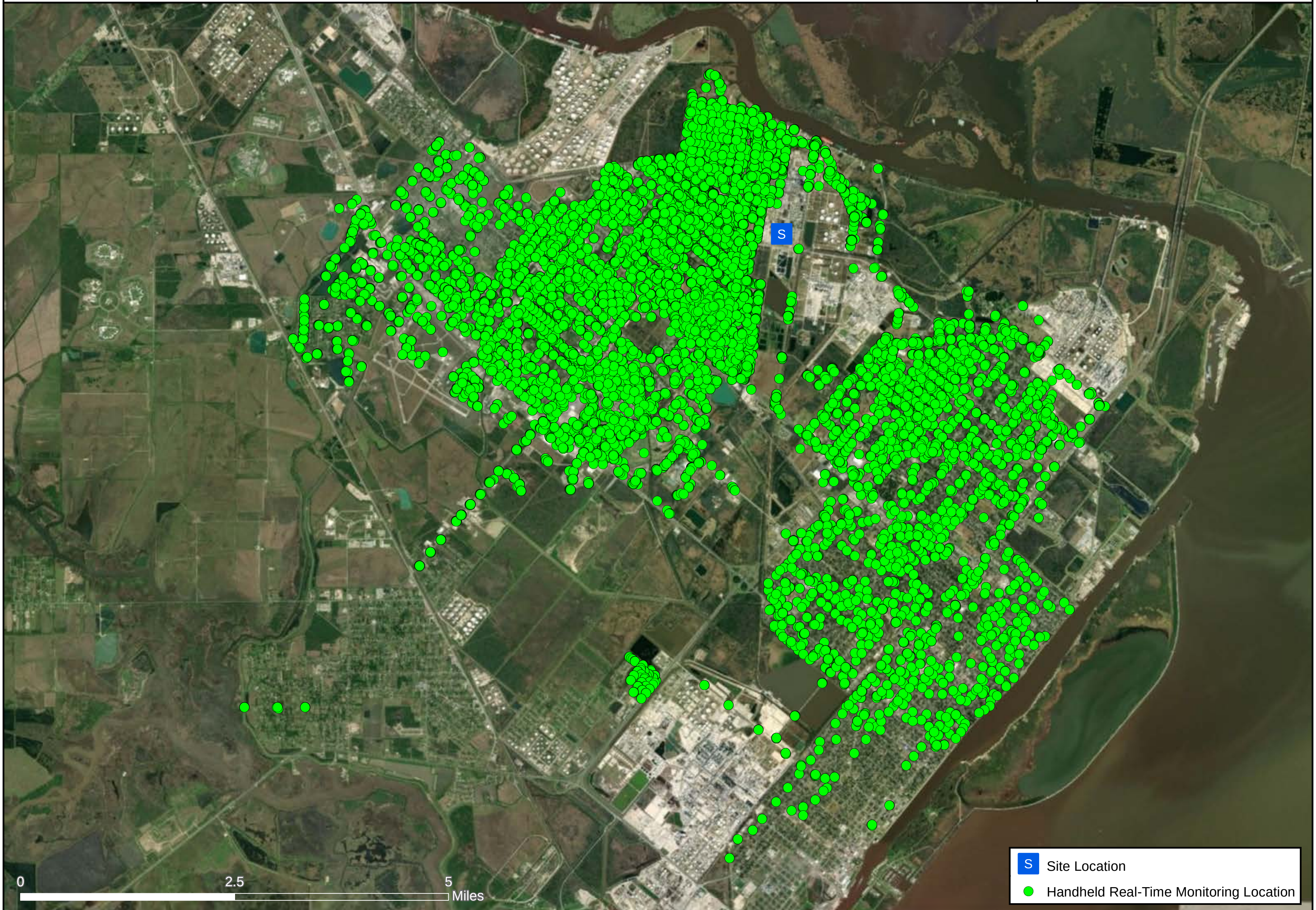


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/13/2020 3:06:18 PM*

Handheld Real-Time Community Monitoring Locations

South 4 Group Fire l Port Neches, TX | 12/5/2019 14:00 - 12/11/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



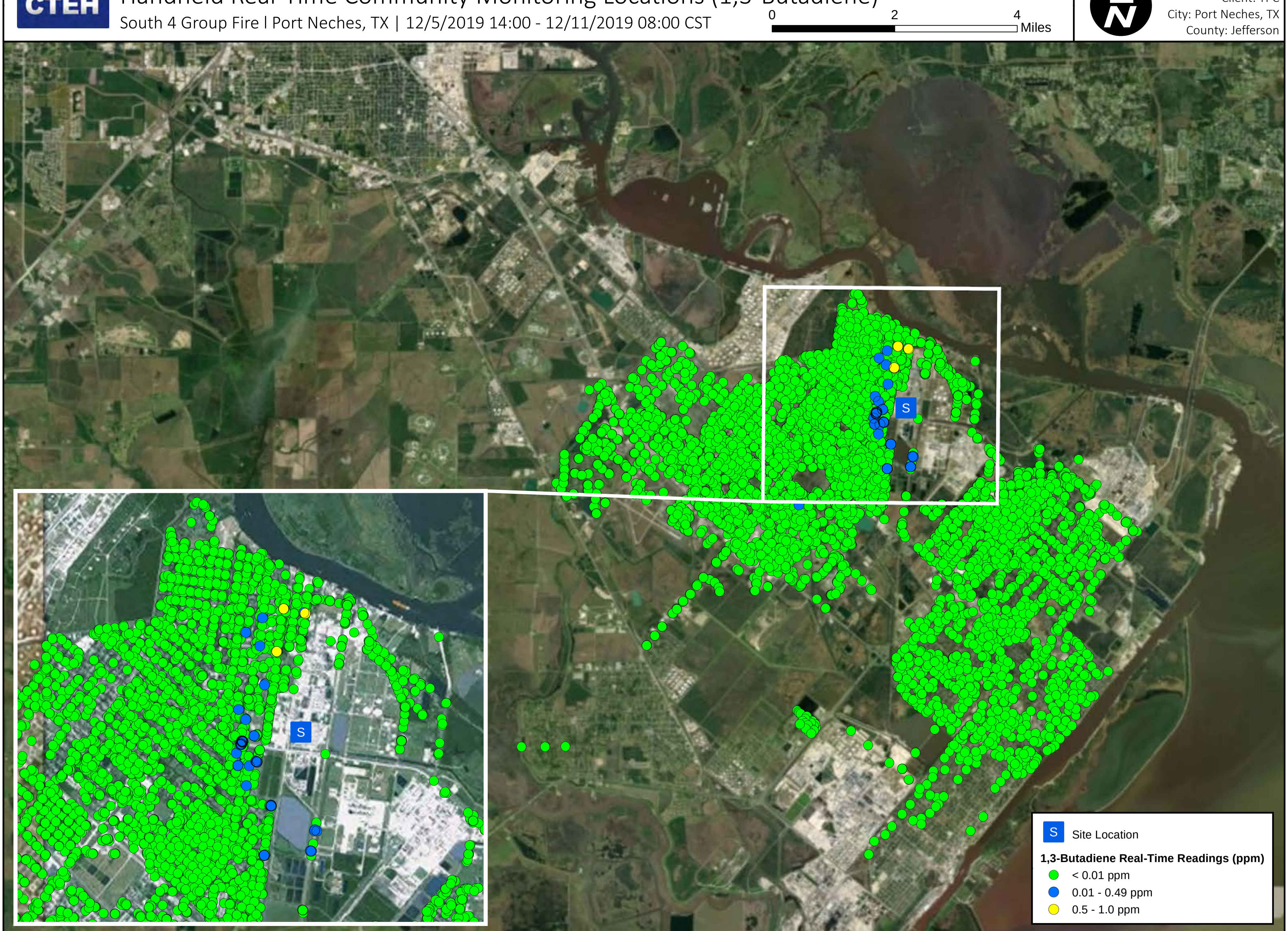
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 3:14:54 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (1,3-Butadiene)

South 4 Group Fire l Port Neches, TX | 12/5/2019 14:00 - 12/11/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

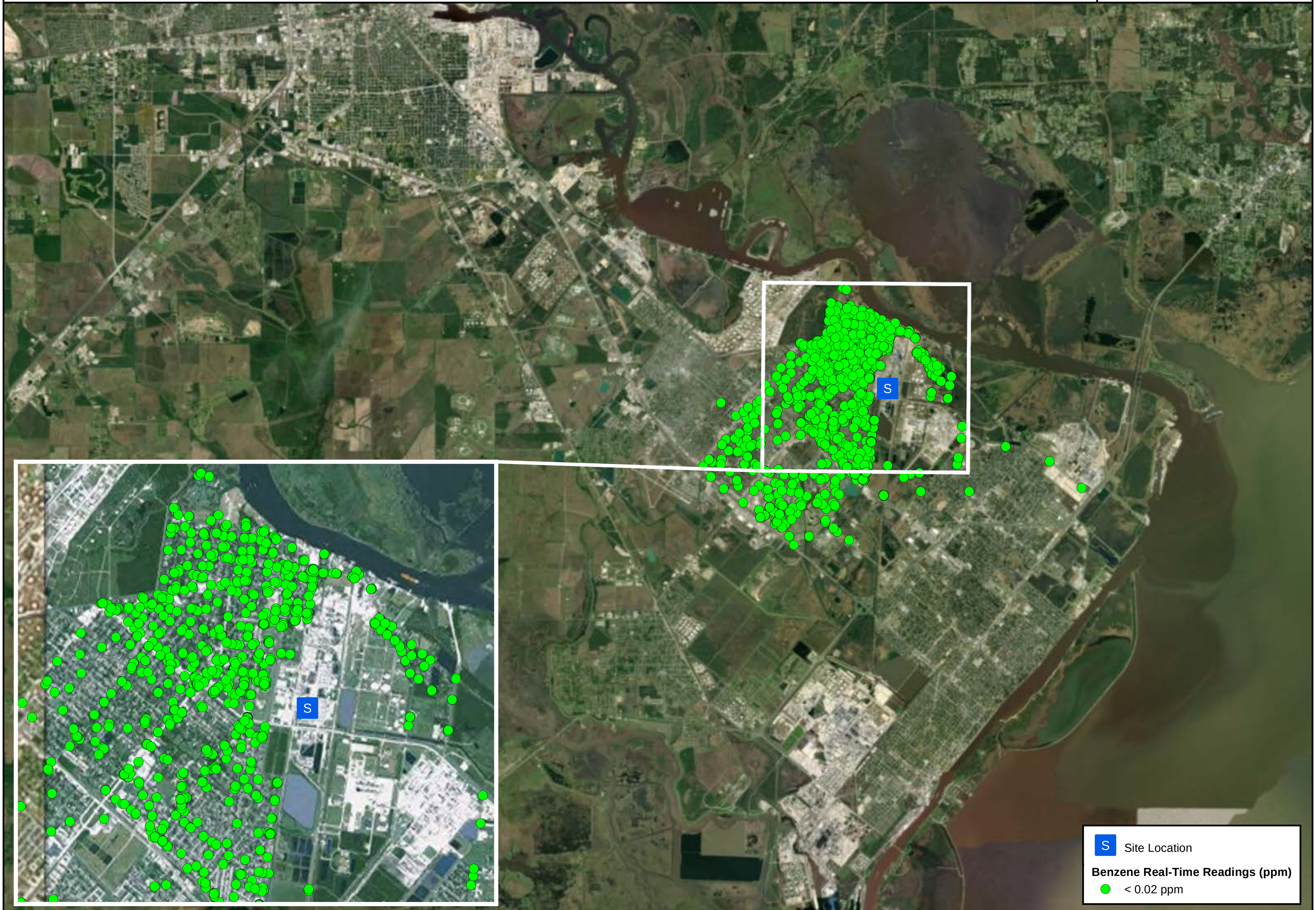


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 4:08:56 PM*

Handheld Real-Time Community Monitoring Locations (Benzene)

South 4 Group Fire l Port Neches, TX | 12/5/2019 14:00 - 12/11/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

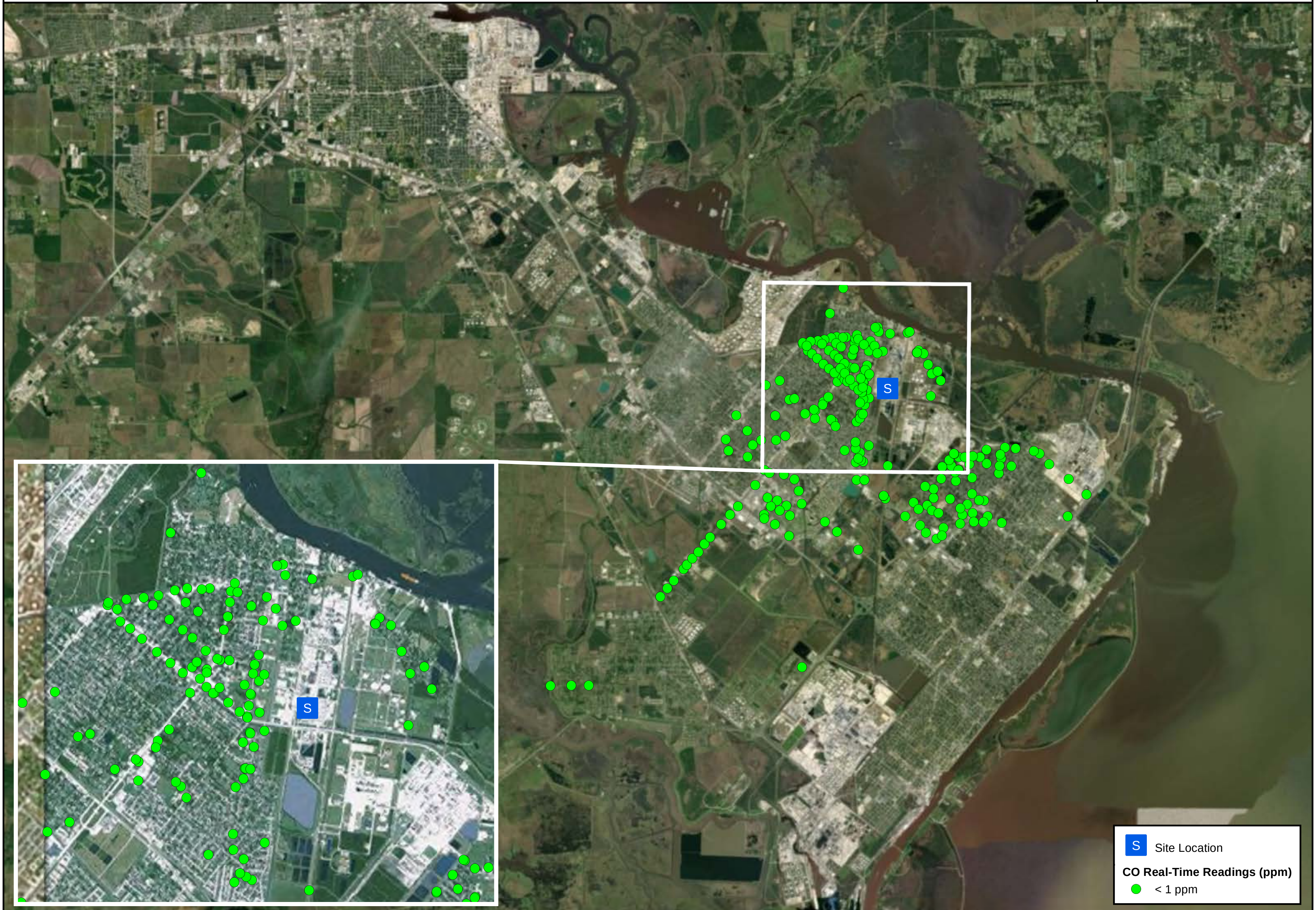


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 3:24:24 PM*

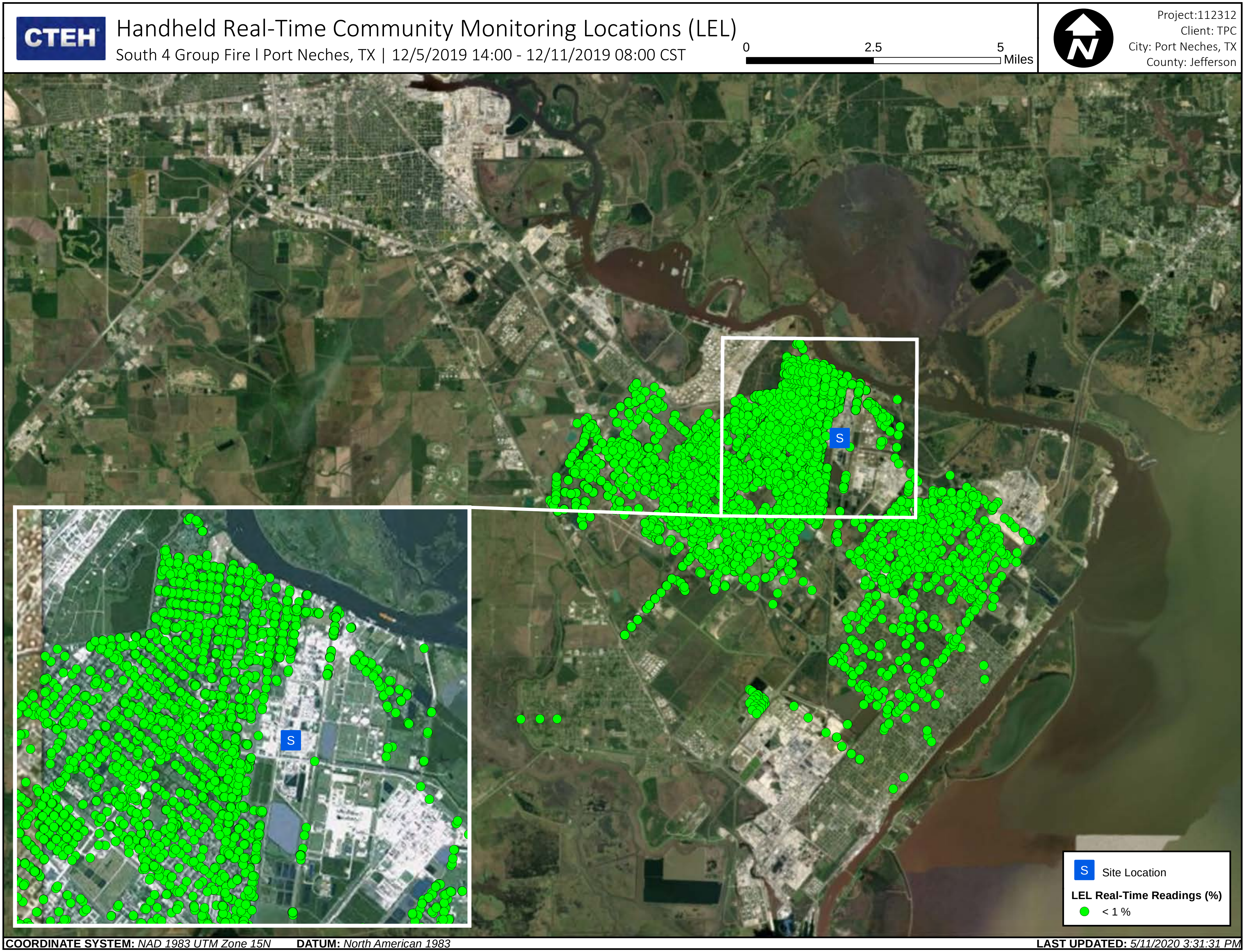
Handheld Real-Time Community Monitoring Locations (CO)

South 4 Group Fire l Port Neches, TX | 12/5/2019 14:00 - 12/11/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



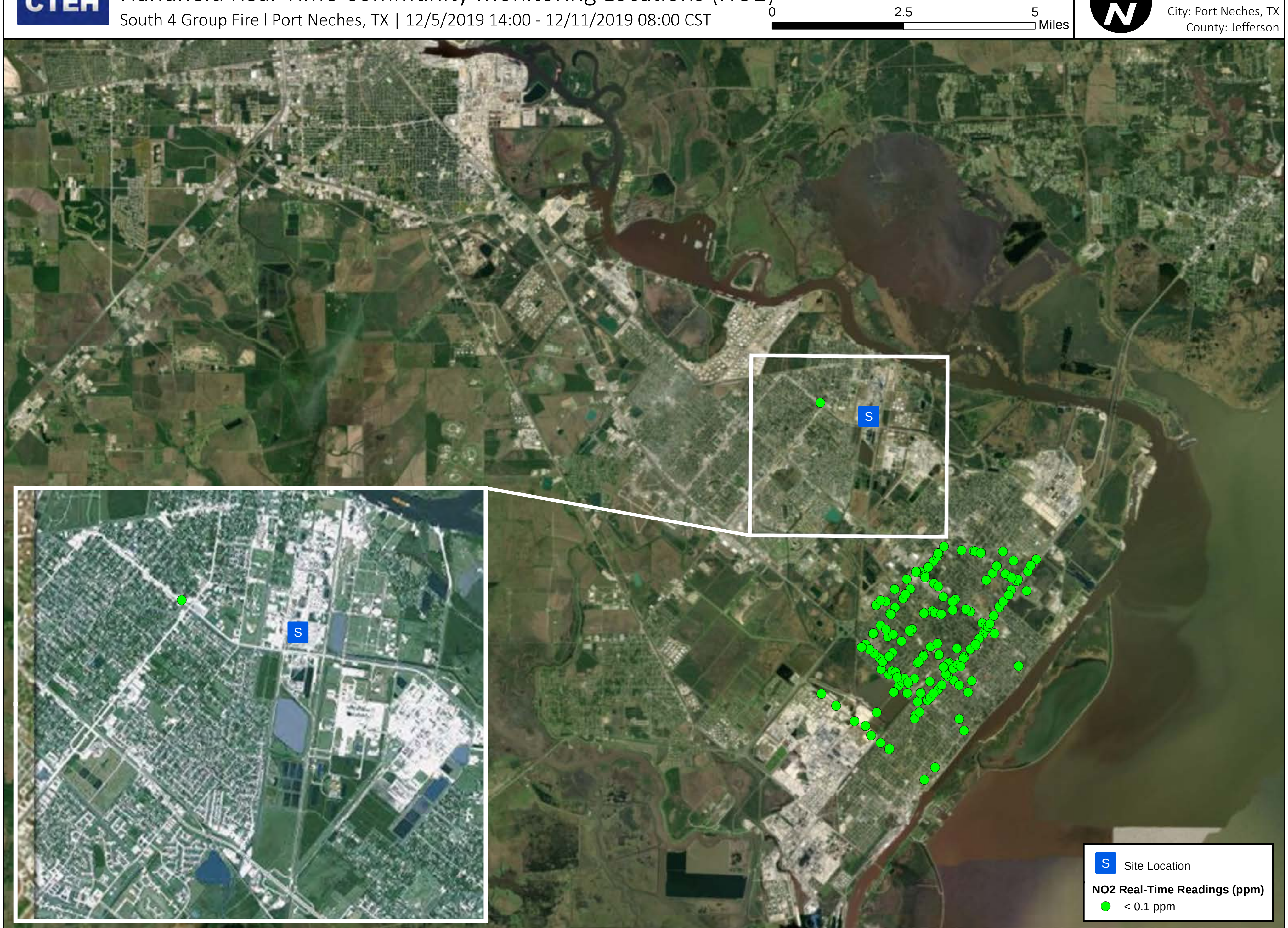
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 3:30:44 PM*


CTEH
Handheld Real-Time Community Monitoring Locations (LEL)
South 4 Group Fire l Port Neches, TX | 12/5/2019 14:00 - 12/11/2019 08:00 CST
0
2.5
5
Miles
N
Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson
S
S
Site Location
LEL Real-Time Readings (%)
< 1 %
COORDINATE SYSTEM: NAD 1983 UTM Zone 15N
DATUM: North American 1983
LAST UPDATED: 5/11/2020 3:31:31 PM

Handheld Real-Time Community Monitoring Locations (NO2)

South 4 Group Fire l Port Neches, TX | 12/5/2019 14:00 - 12/11/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

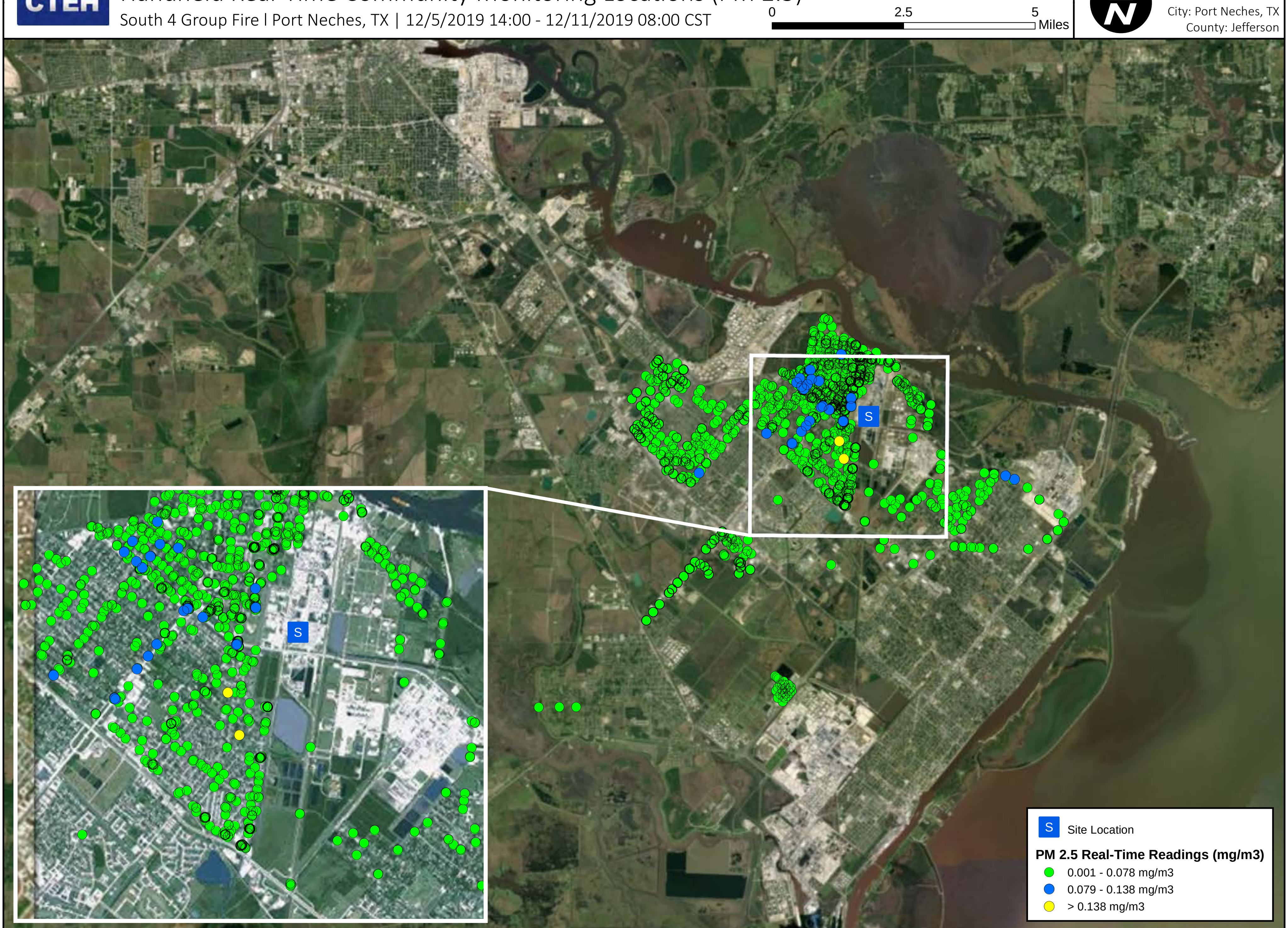


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 3:39:27 PM*

Handheld Real-Time Community Monitoring Locations (PM 2.5)

South 4 Group Fire l Port Neches, TX | 12/5/2019 14:00 - 12/11/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

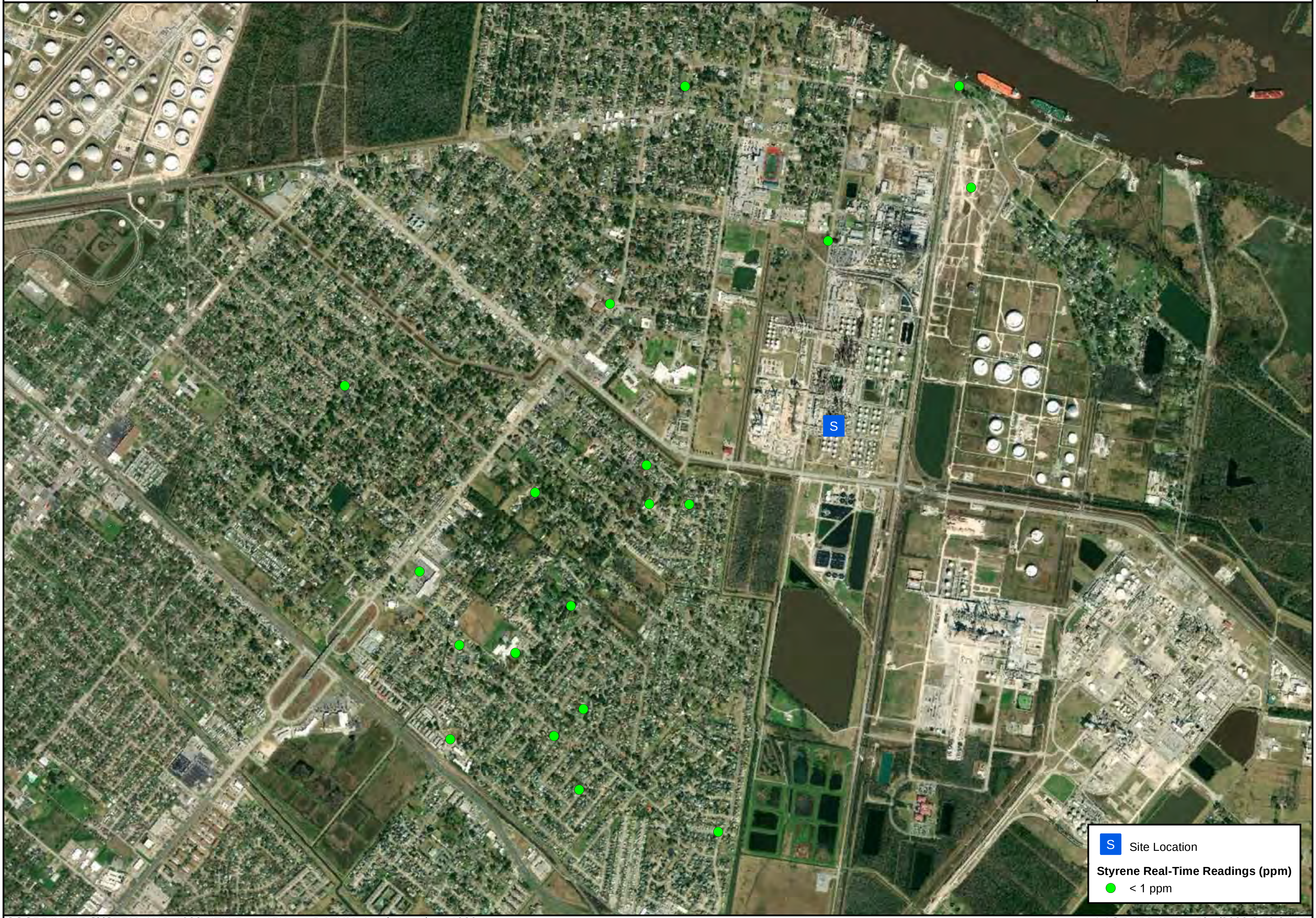


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 3:34:09 PM*

Handheld Real-Time Community Monitoring Locations (Styrene)

South 4 Group Fire | Port Neches, TX | 12/5/2019 14:00 - 12/11/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



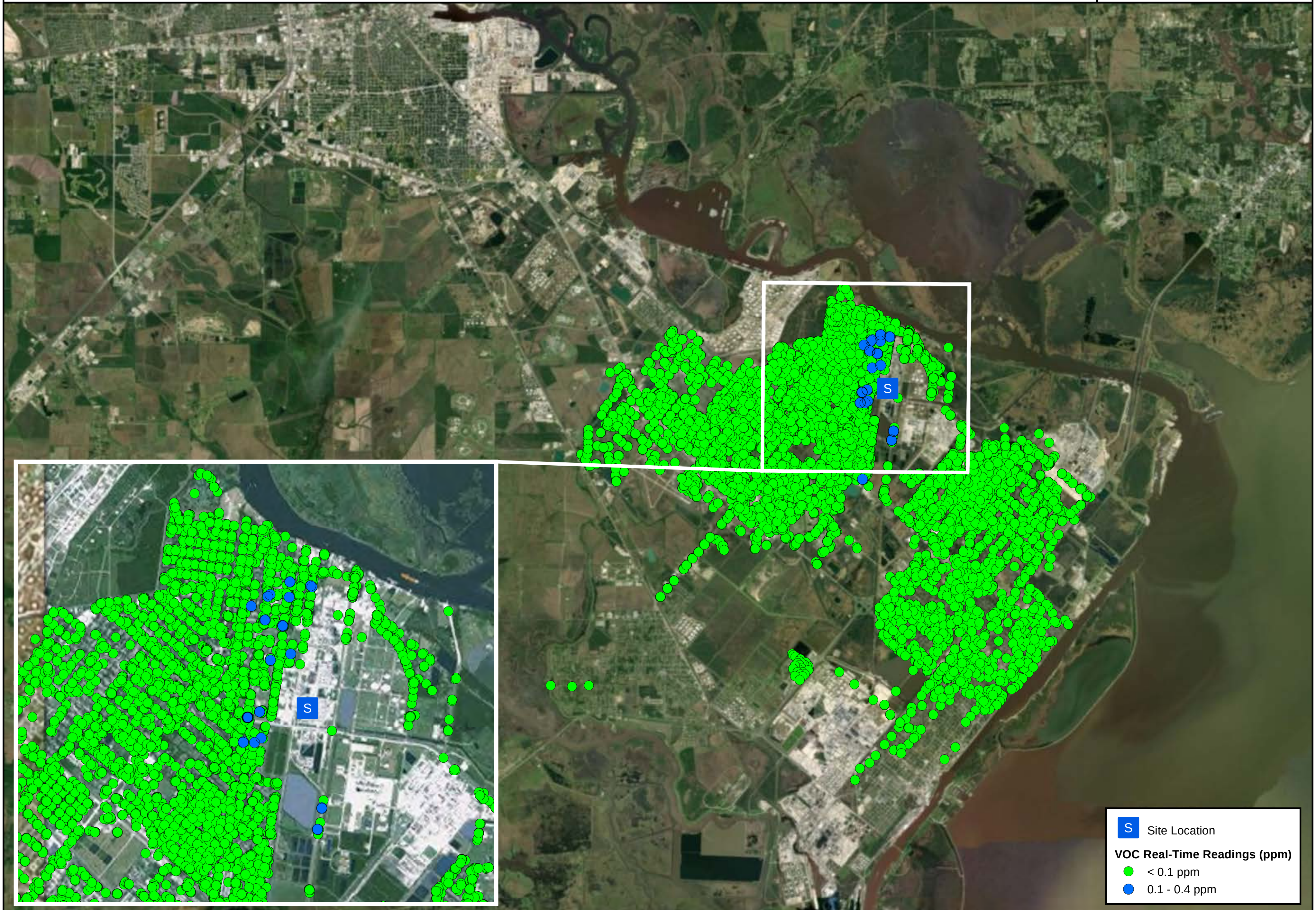
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 3:59:21 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (VOCs)

South 4 Group Fire l Port Neches, TX | 12/5/2019 14:00 - 12/11/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



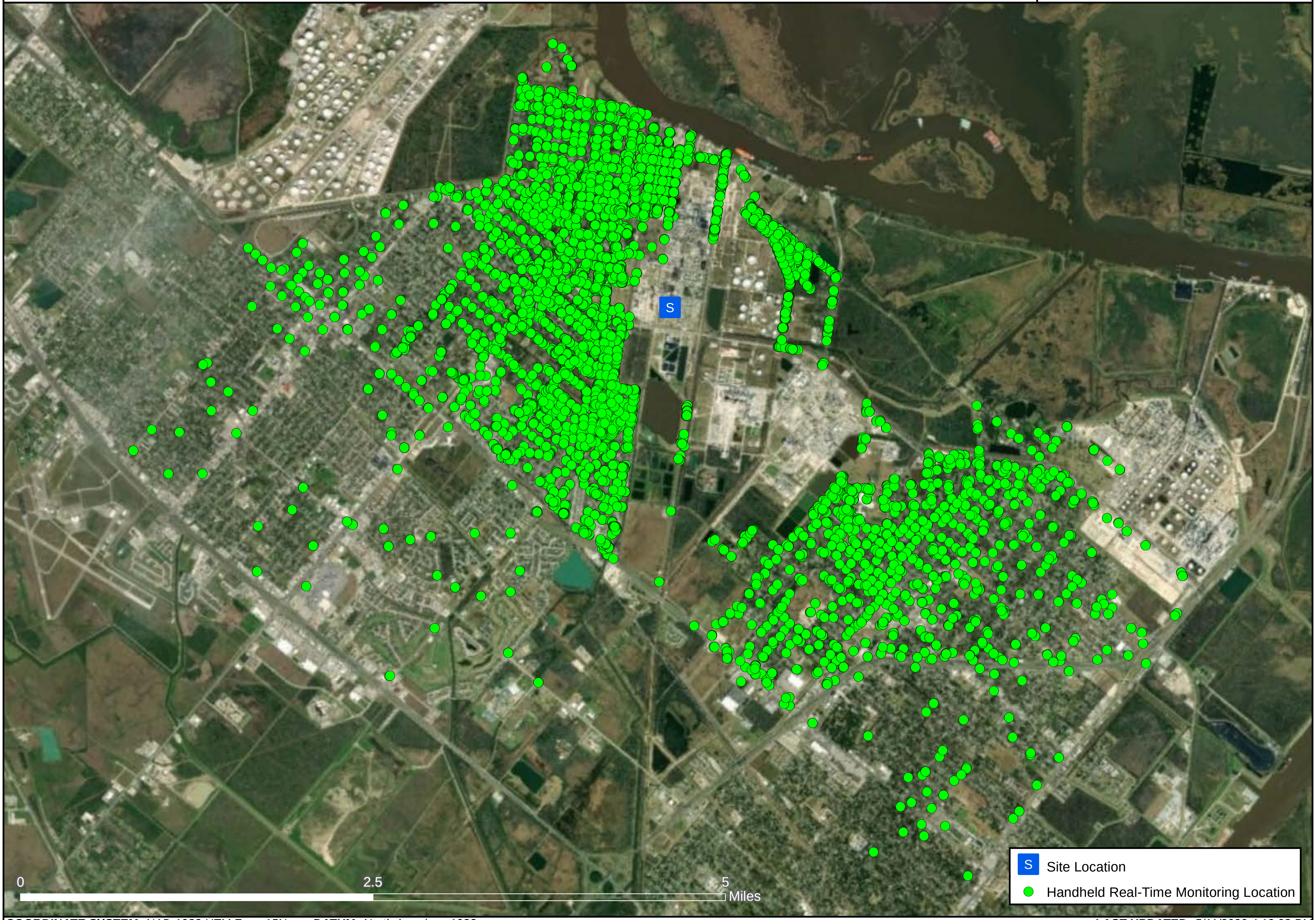
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 3:56:35 PM*

CTEH

Handheld Real-Time Community Monitoring Locations

South 4 Group Fire l Port Neches, TX | 12/11/2019 08:00 - 12/19/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

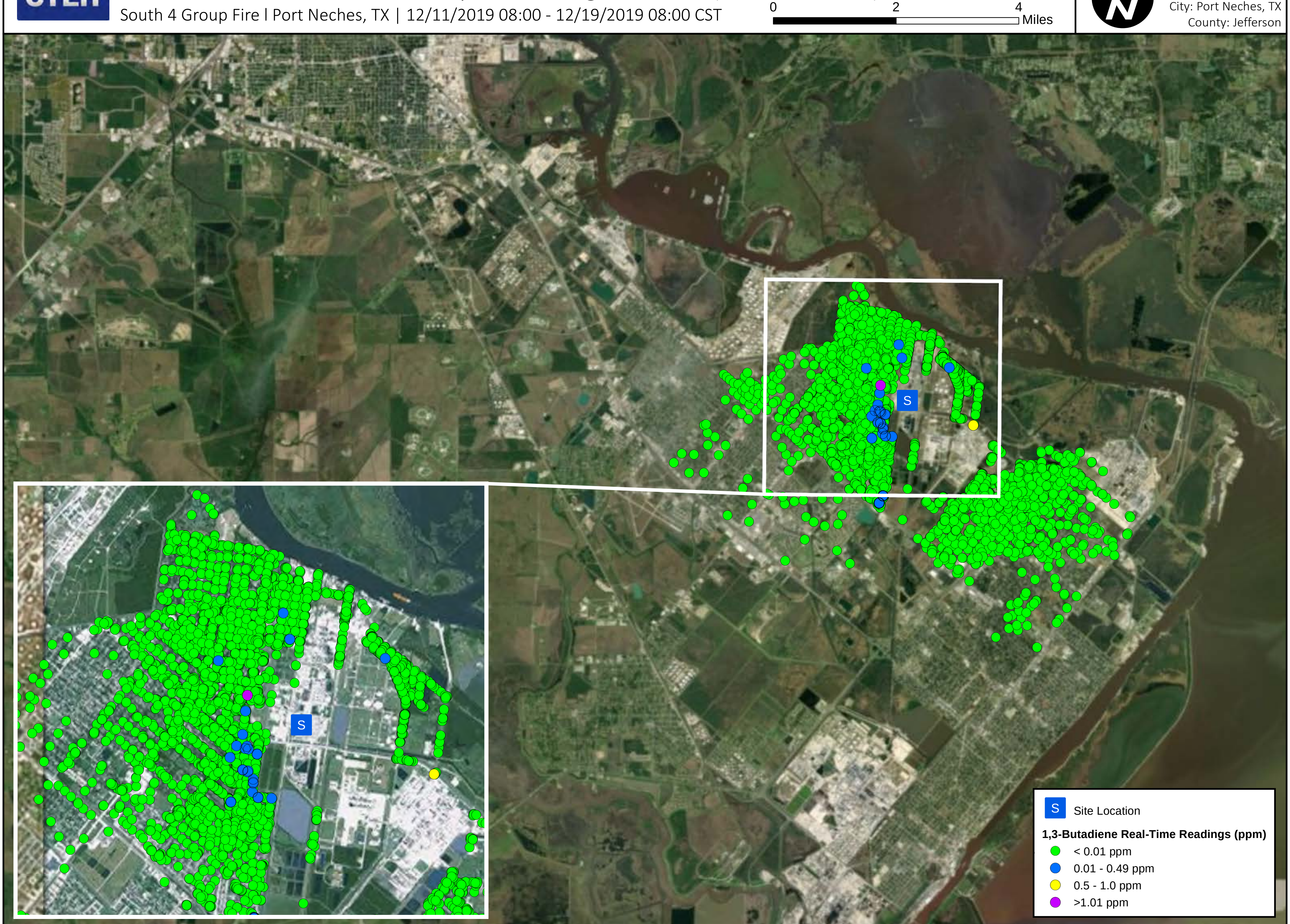


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 4:12:08 PM*

Handheld Real-Time Community Monitoring Locations (1,3-Butadiene)

South 4 Group Fire l Port Neches, TX | 12/11/2019 08:00 - 12/19/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 4:24:19 PM*

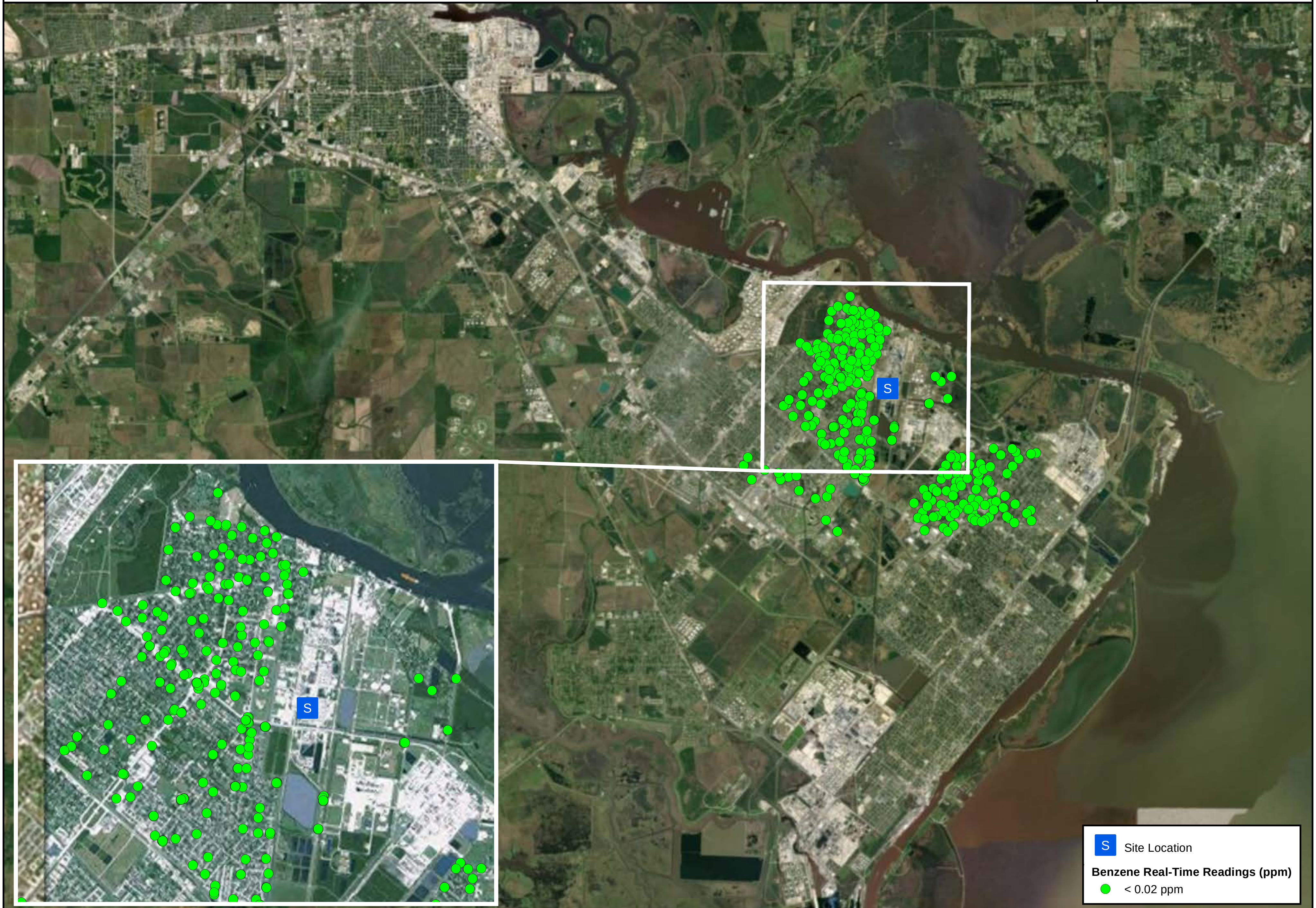
CTEH

Handheld Real-Time Community Monitoring Locations (Benzene)

South 4 Group Fire l Port Neches, TX | 12/11/2019 08:00 - 12/19/2019 08:00 CST

0 2.5 5 Miles

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



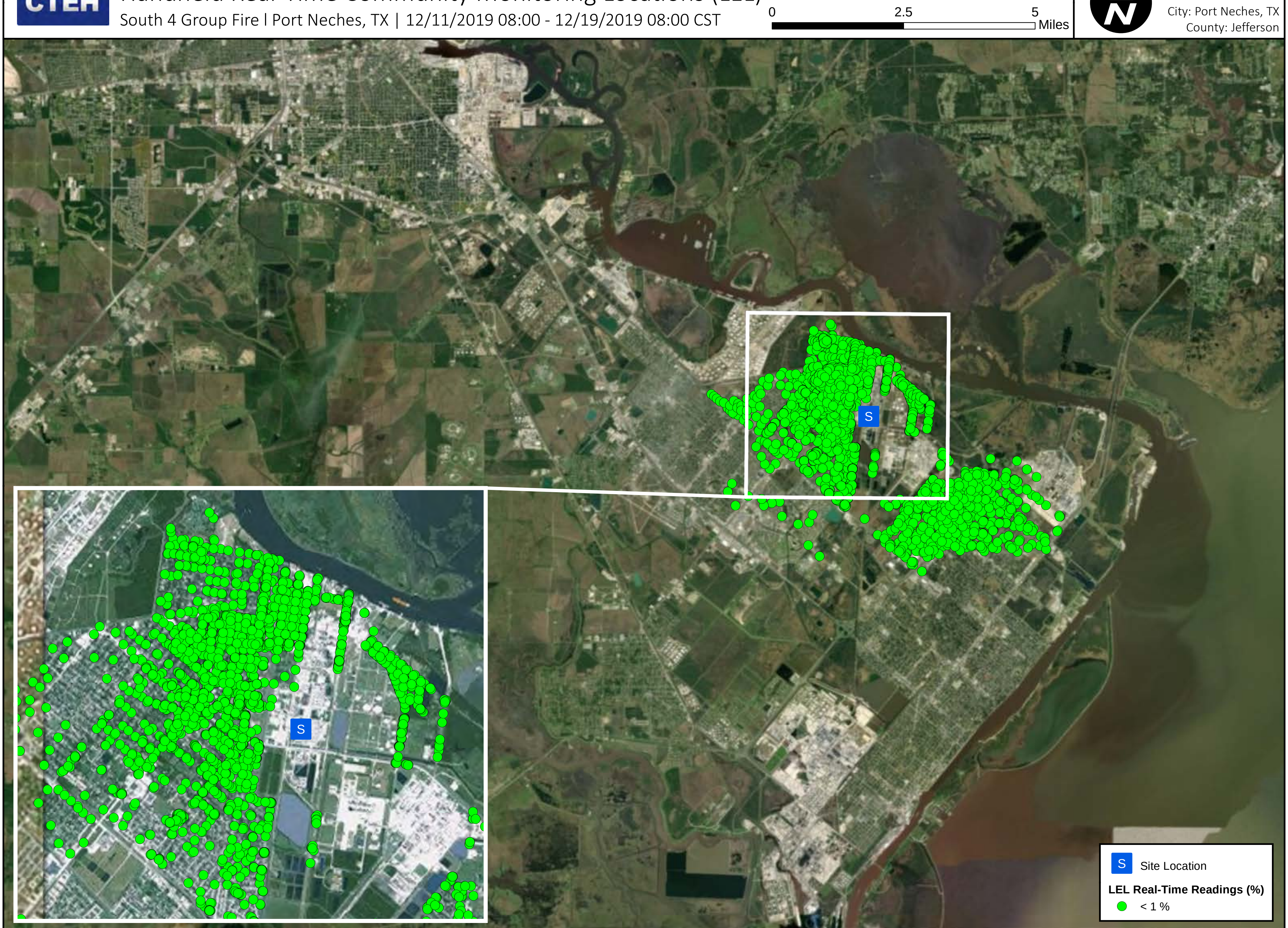
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 4:14:24 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (LEL)

South 4 Group Fire l Port Neches, TX | 12/11/2019 08:00 - 12/19/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



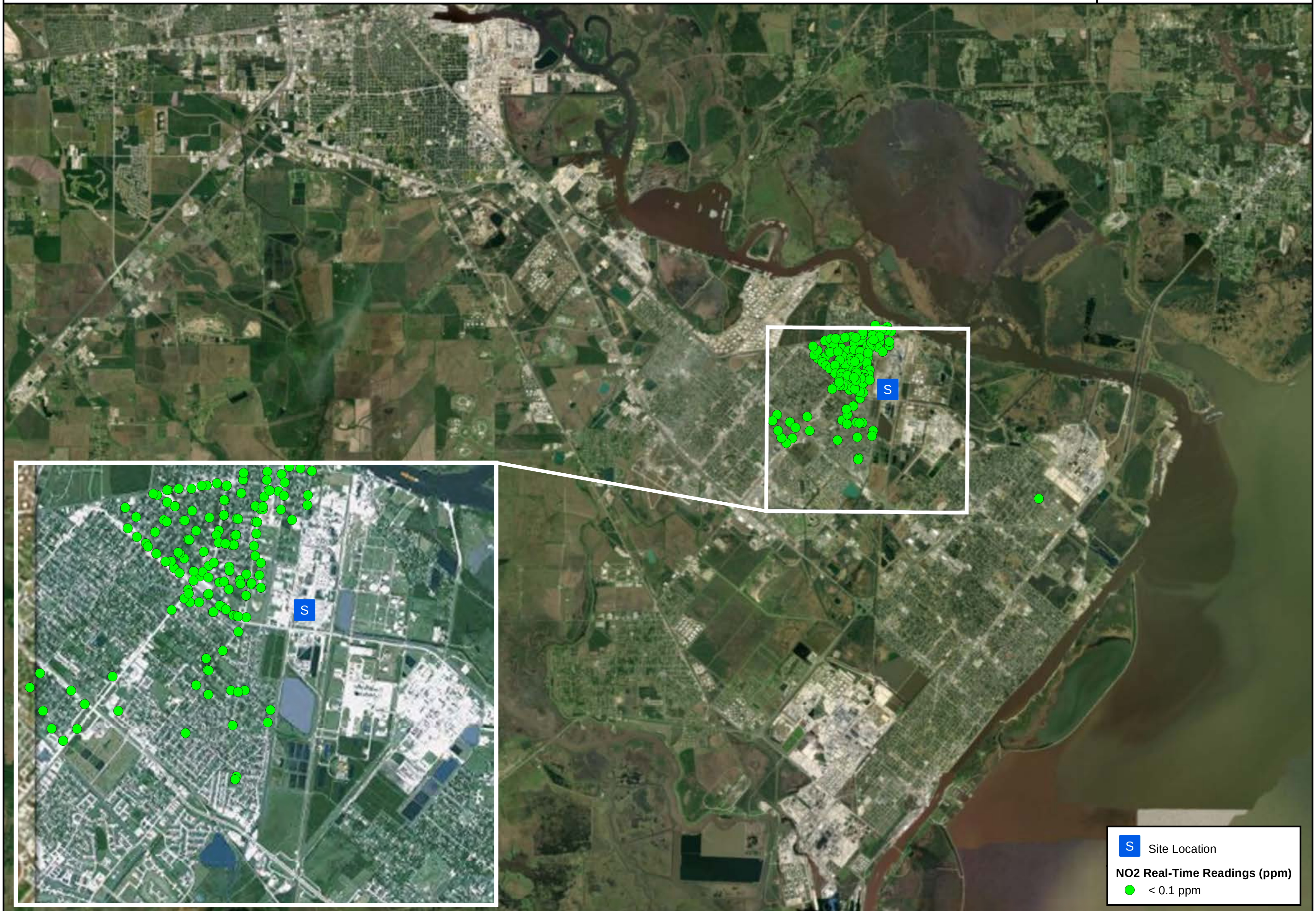
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 4:20:21 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (NO2)

South 4 Group Fire l Port Neches, TX | 12/11/2019 08:00 - 12/19/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



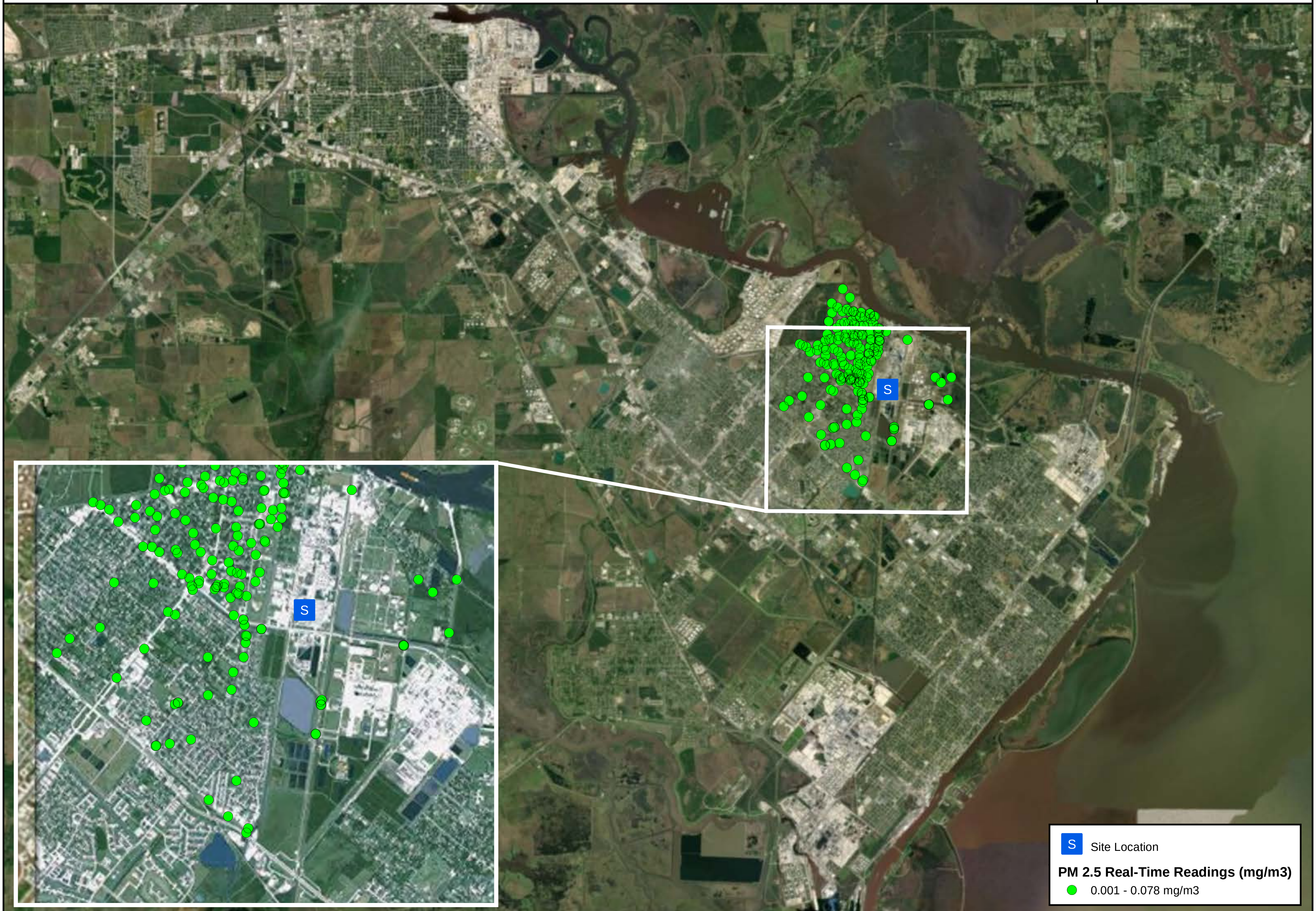
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 4:28:59 PM*

CTEH

Handheld Real-Time Community Monitoring Locations (PM 2.5)

South 4 Group Fire l Port Neches, TX | 12/11/2019 08:00 - 12/19/2019 08:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 4:27:27 PM*

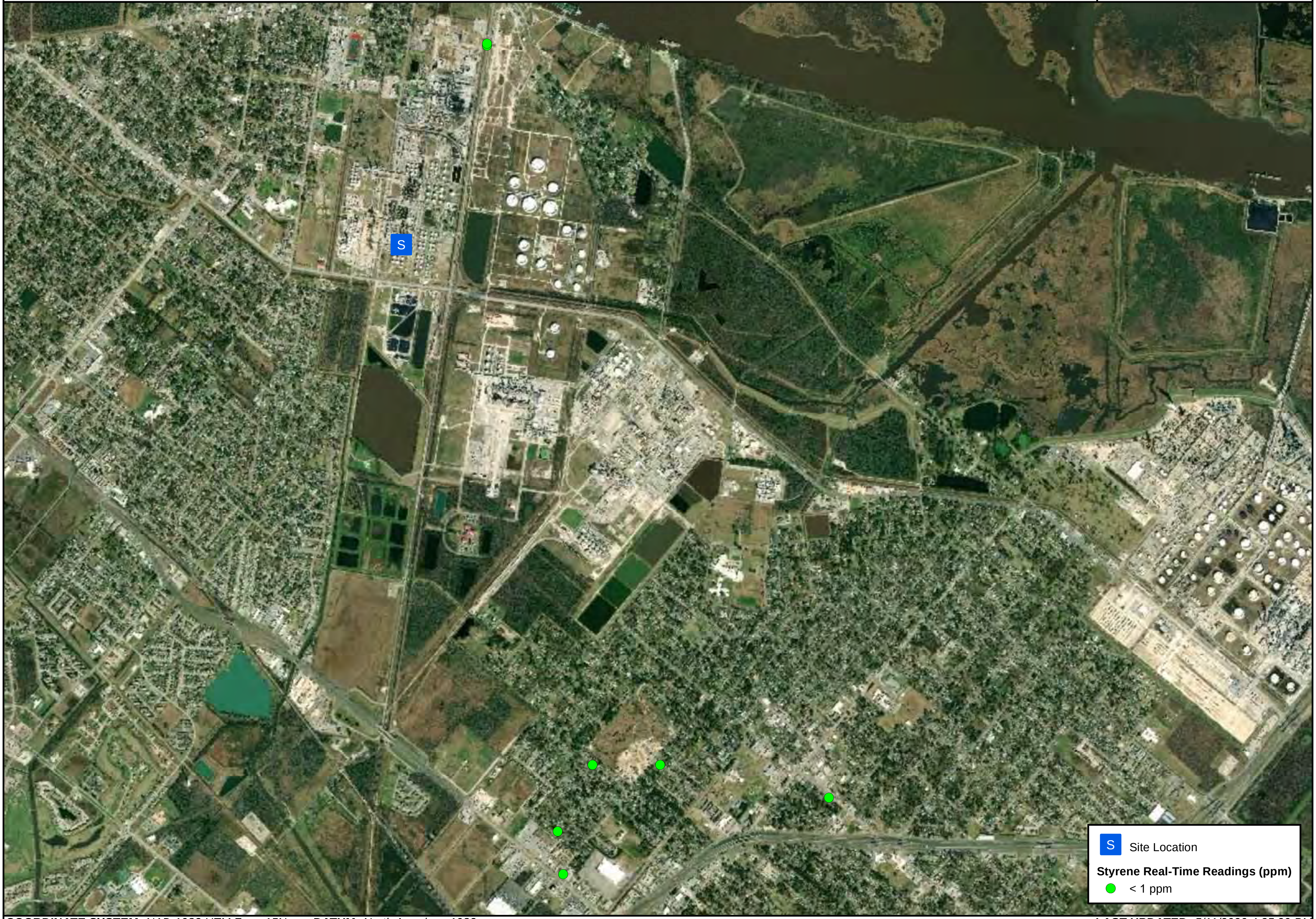
CTEH

Handheld Real-Time Community Monitoring Locations (Styrene)

South 4 Group Fire | Port Neches, TX | 12/11/2019 08:00 - 12/19/2019 08:00 CST

0 0.5 1 Miles

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 4:35:29 PM*

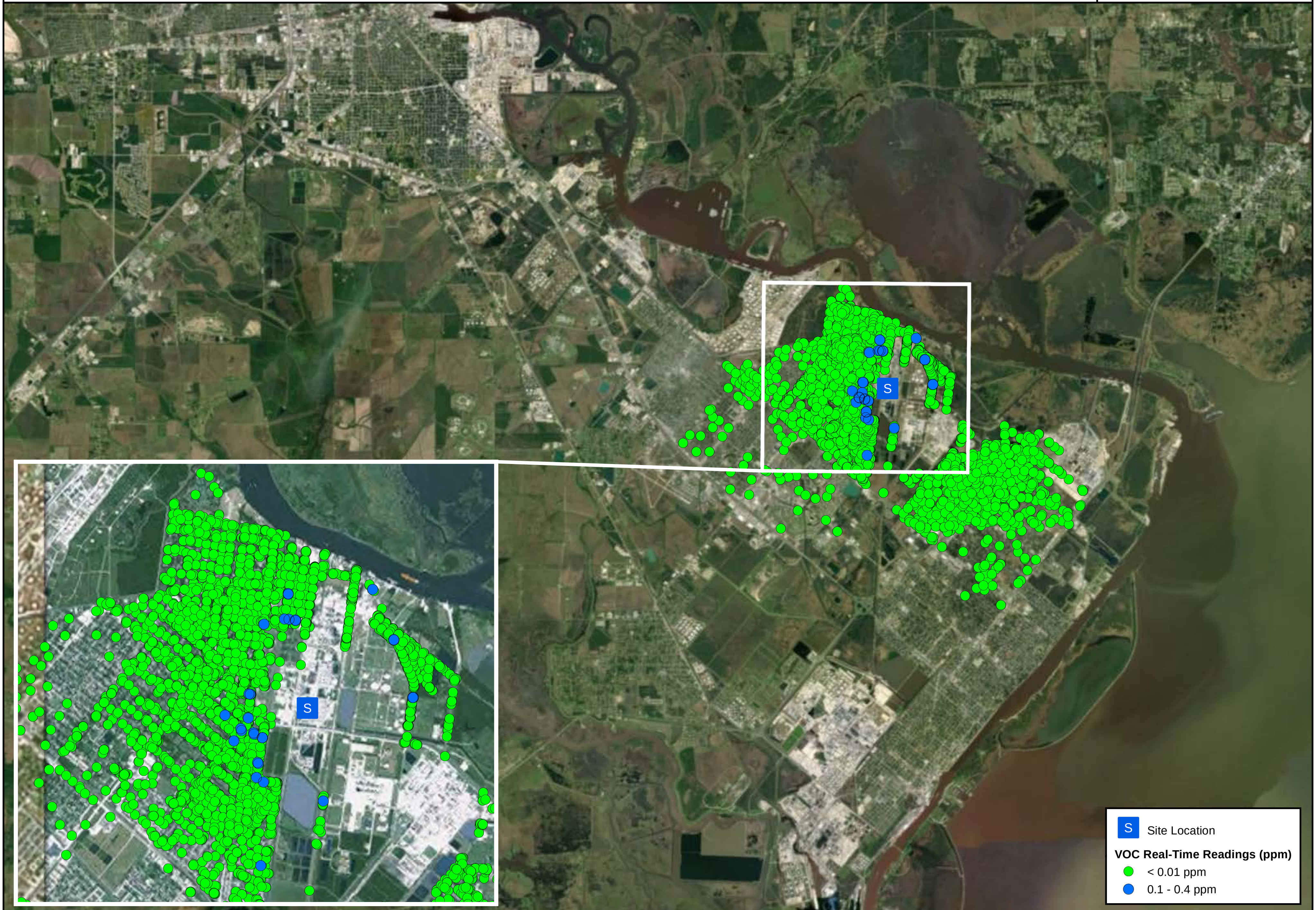
CTEH

Handheld Real-Time Community Monitoring Locations (VOCs)

South 4 Group Fire l Port Neches, TX | 12/11/2019 08:00 - 12/19/2019 08:00 CST

0 2.5 5 Miles

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



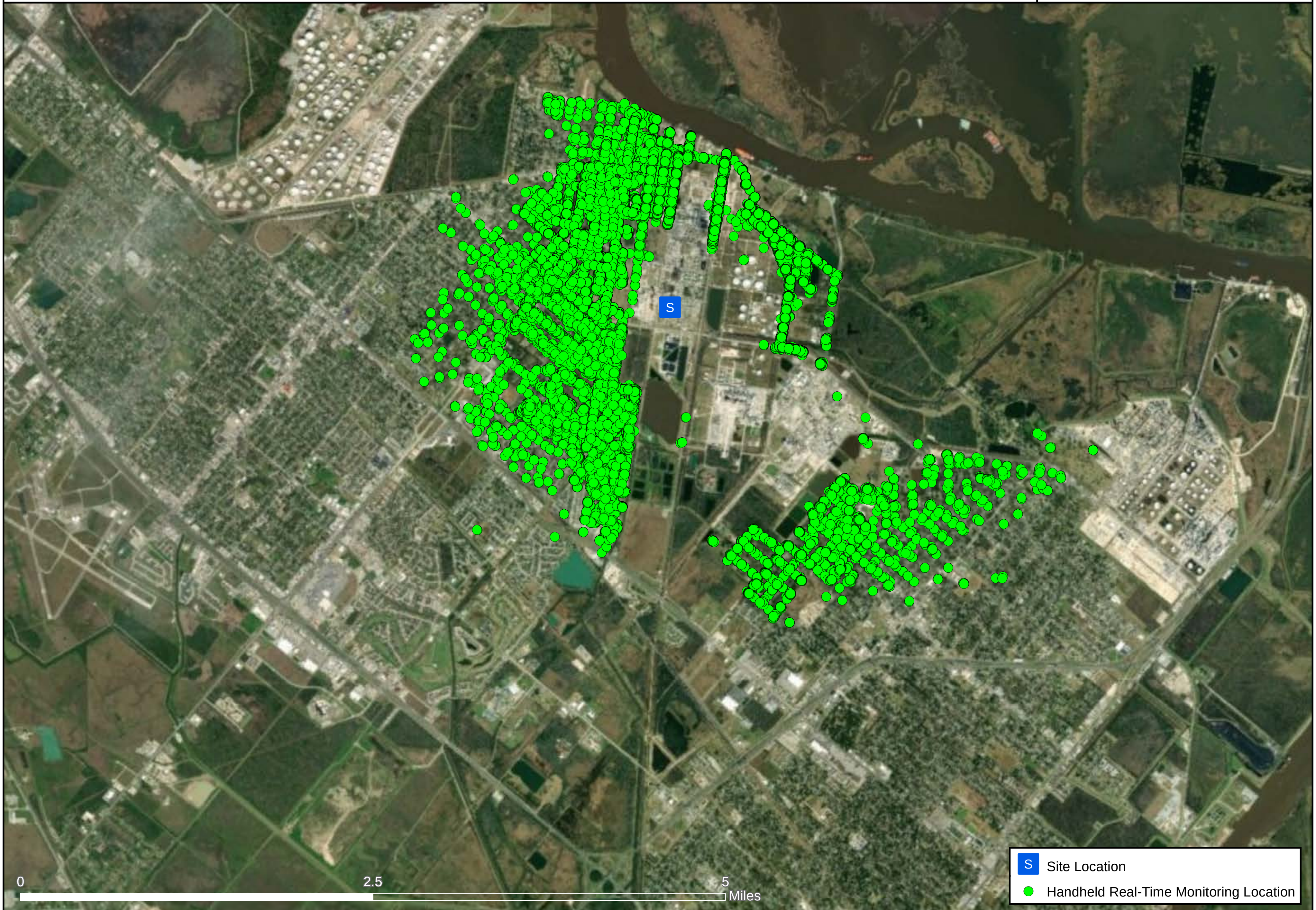
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 4:33:05 PM*

CTEH

Handheld Real-Time Community Monitoring Locations

South 4 Group Fire l Port Neches, TX | 12/19/2019 08:00 - 1/30/2020 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson

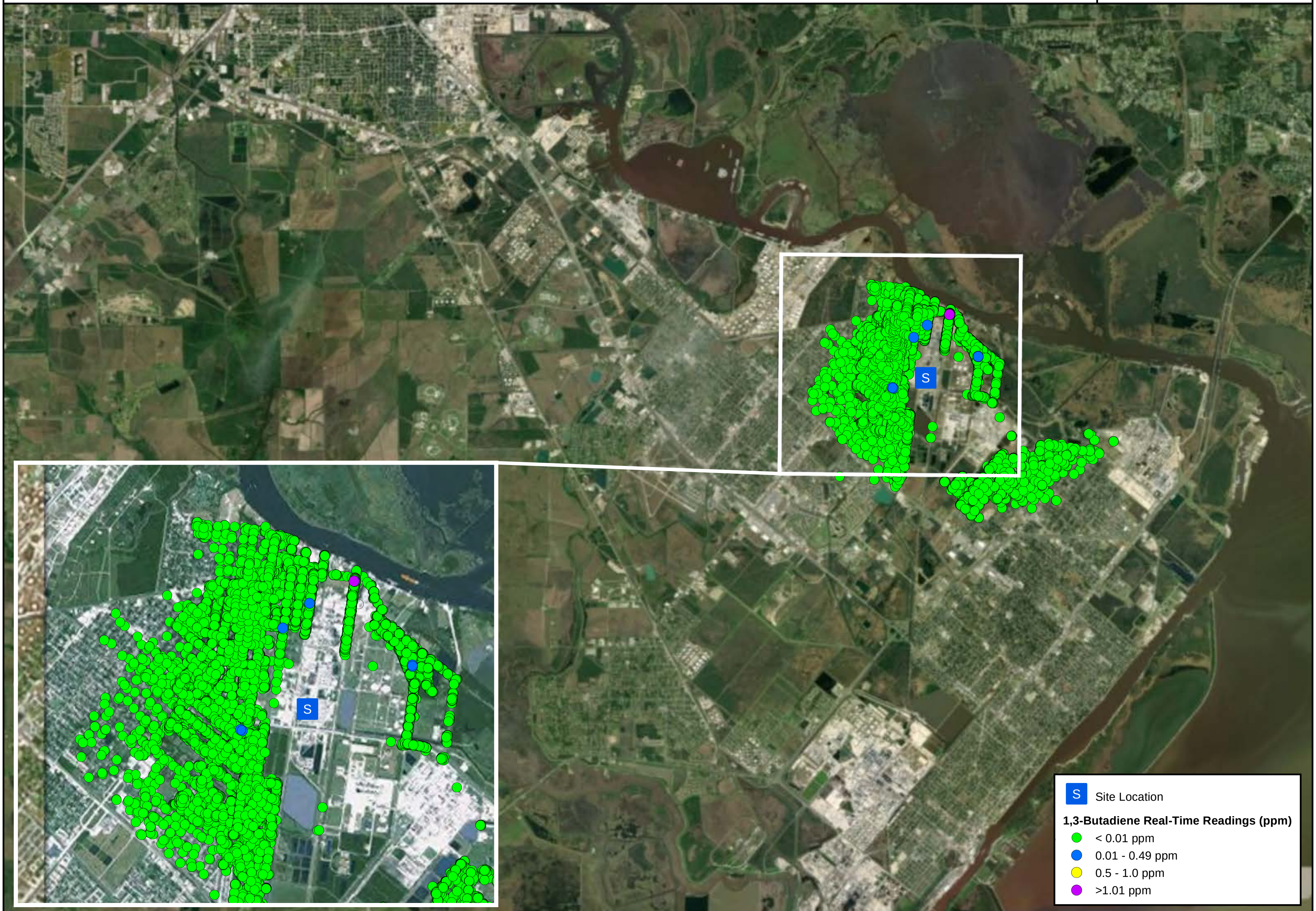


COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 10:34:51 AM*

Handheld Real-Time Community Monitoring Locations (1,3-Butadiene)

South 4 Group Fire l Port Neches, TX | 12/19/2019 08:00 - 1/30/2020 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



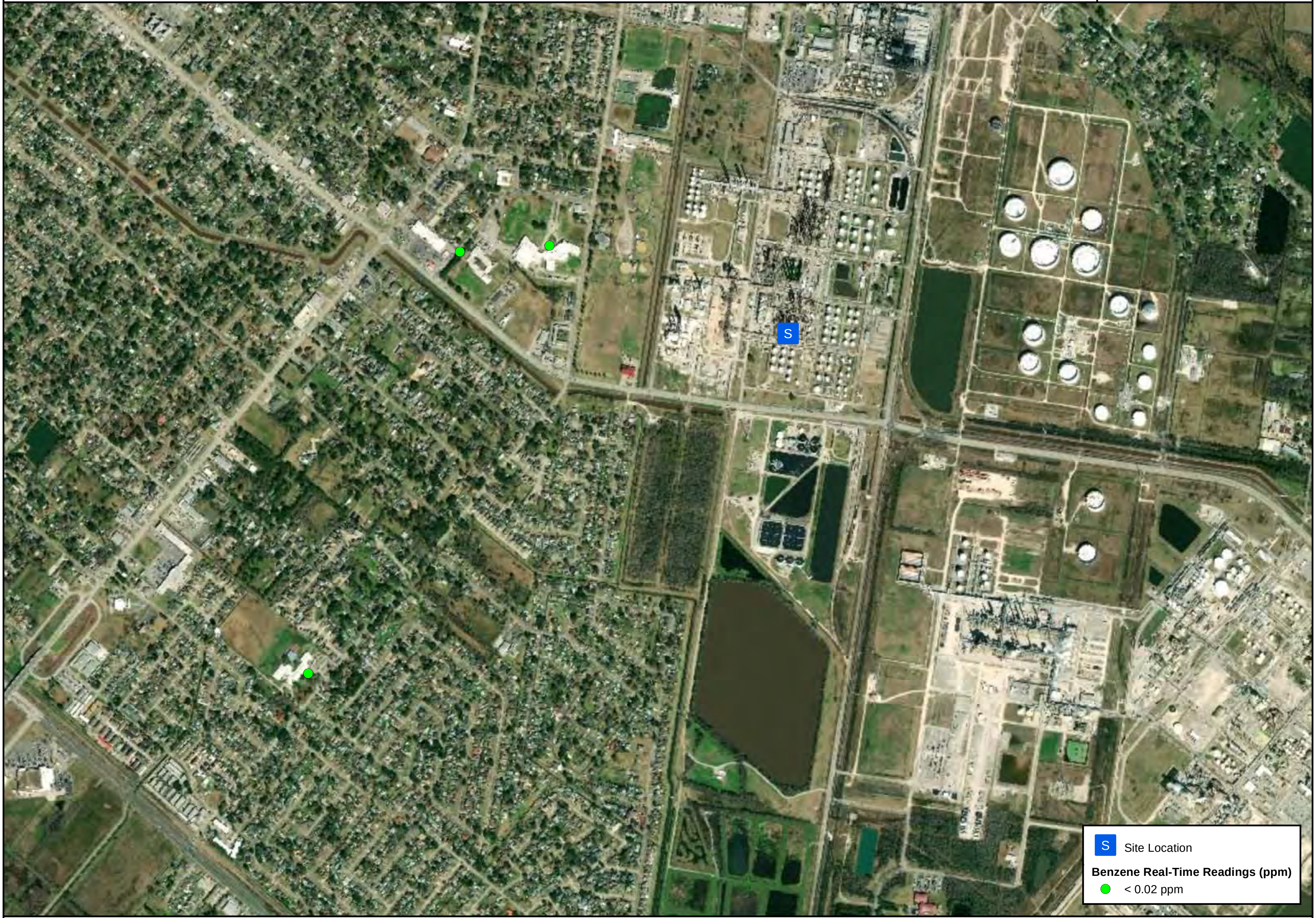
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 5:58:06 PM*

![CTEH]

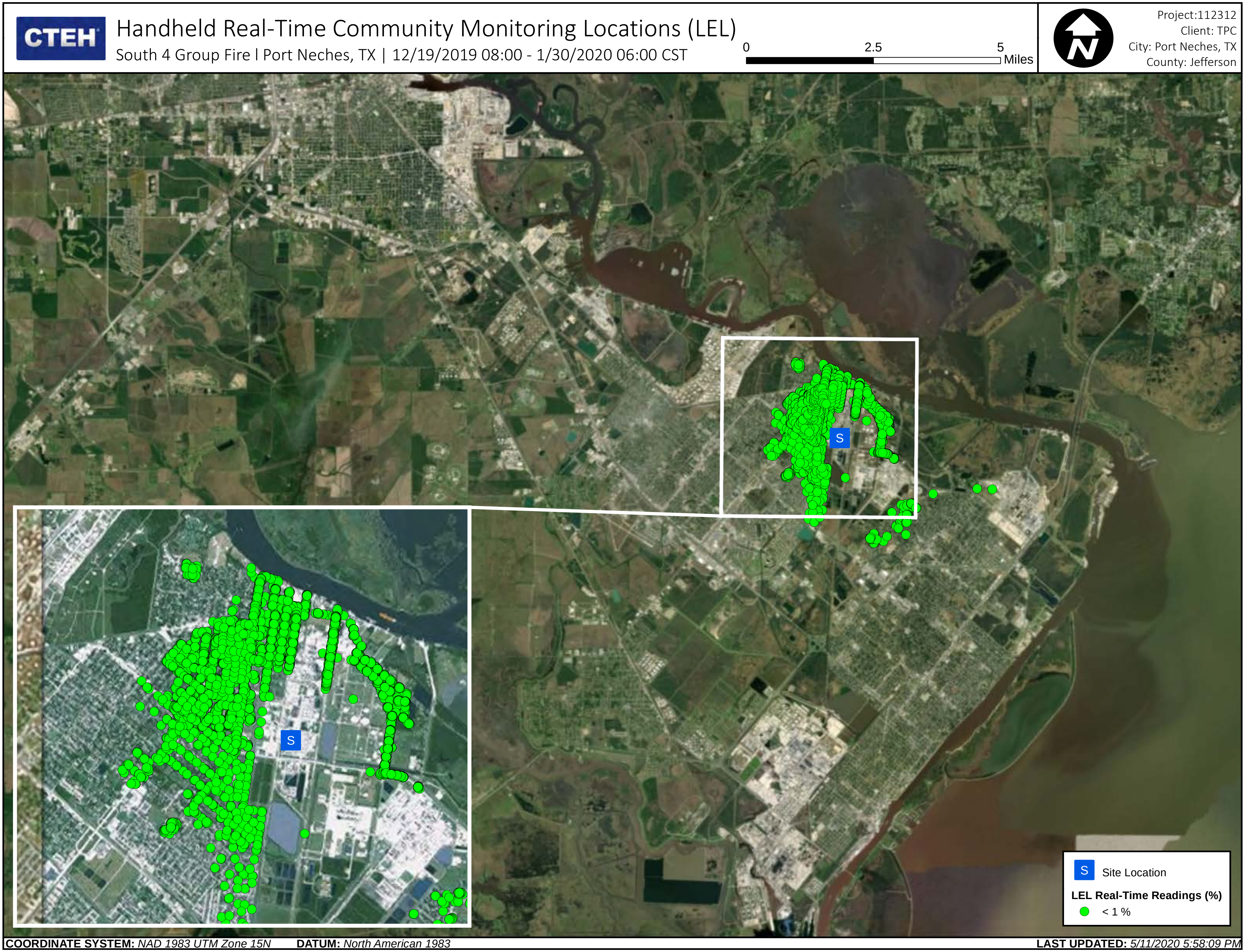
Handheld Real-Time Community Monitoring Locations (Benzene)

South 4 Group Fire | Port Neches, TX | 12/19/2019 08:00 - 1/30/2020 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



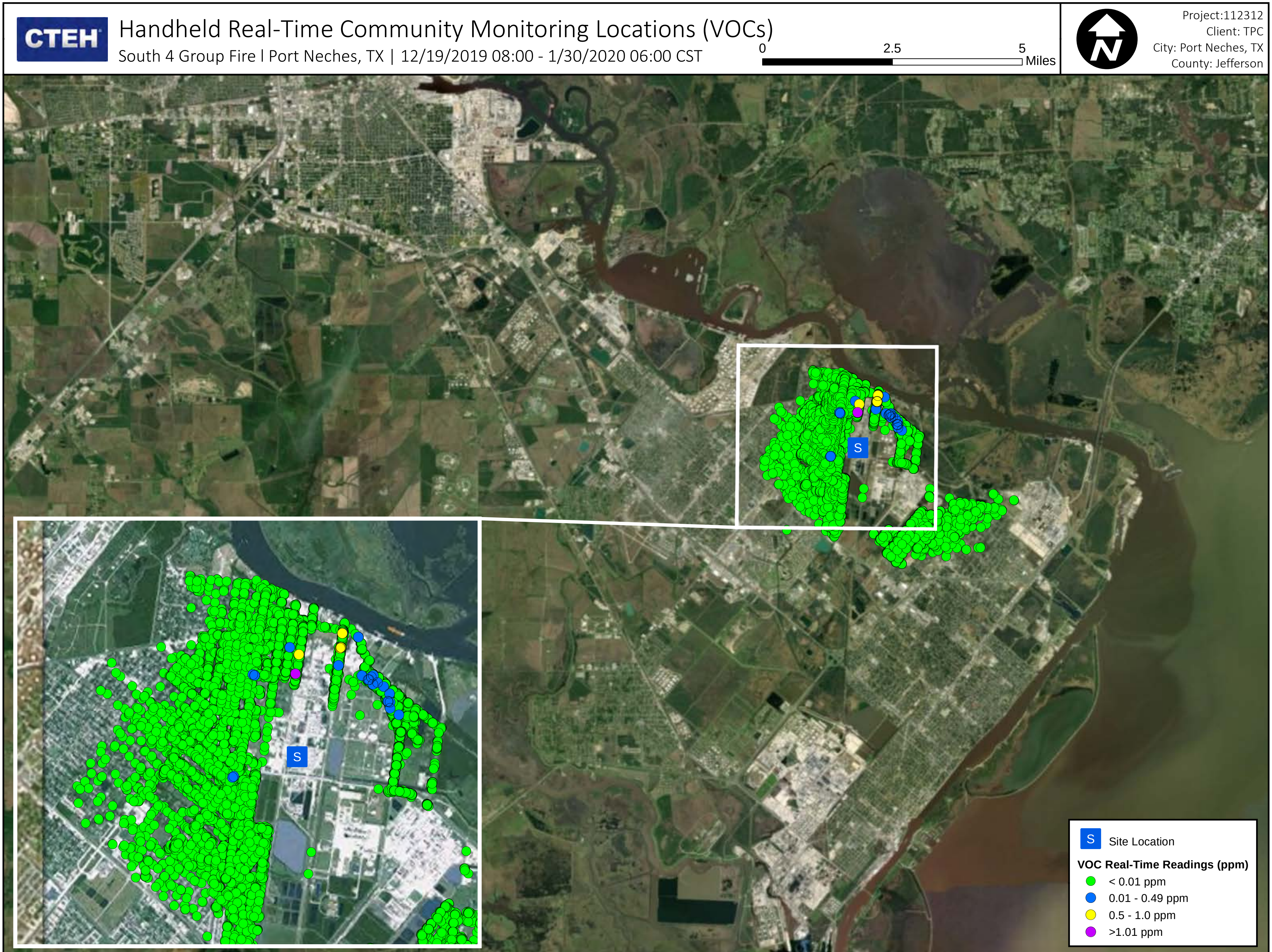
COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 4:40:17 PM*


CTEH
Handheld Real-Time Community Monitoring Locations (LEL)
South 4 Group Fire l Port Neches, TX | 12/19/2019 08:00 - 1/30/2020 06:00 CST
0
2.5
5
Miles
N
Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson
S
S
S Site Location
LEL Real-Time Readings (%)
< 1 %
COORDINATE SYSTEM: NAD 1983 UTM Zone 15N
DATUM: North American 1983
LAST UPDATED: 5/11/2020 5:58:09 PM

Handheld Real-Time Community Monitoring Locations (VOCs)

South 4 Group Fire l Port Neches, TX | 12/19/2019 08:00 - 1/30/2020 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *5/11/2020 4:45:55 PM*

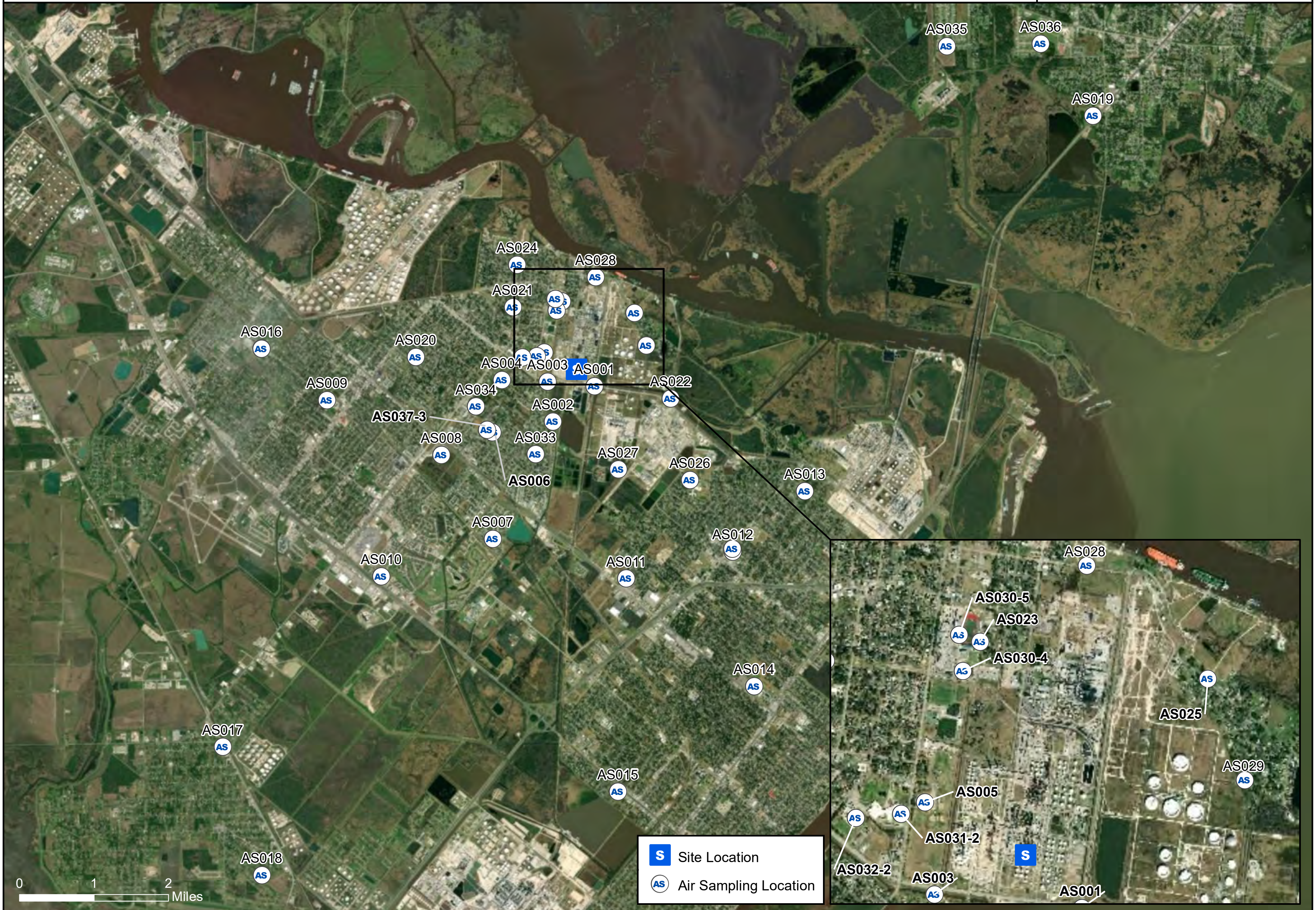
Appendix D

Analytical Air Sampling Locations

Analytical Sampling Locations

South 4 Group Fire l Port Neches, TX | 11/27/2019 09:33 - 12/11/2019 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



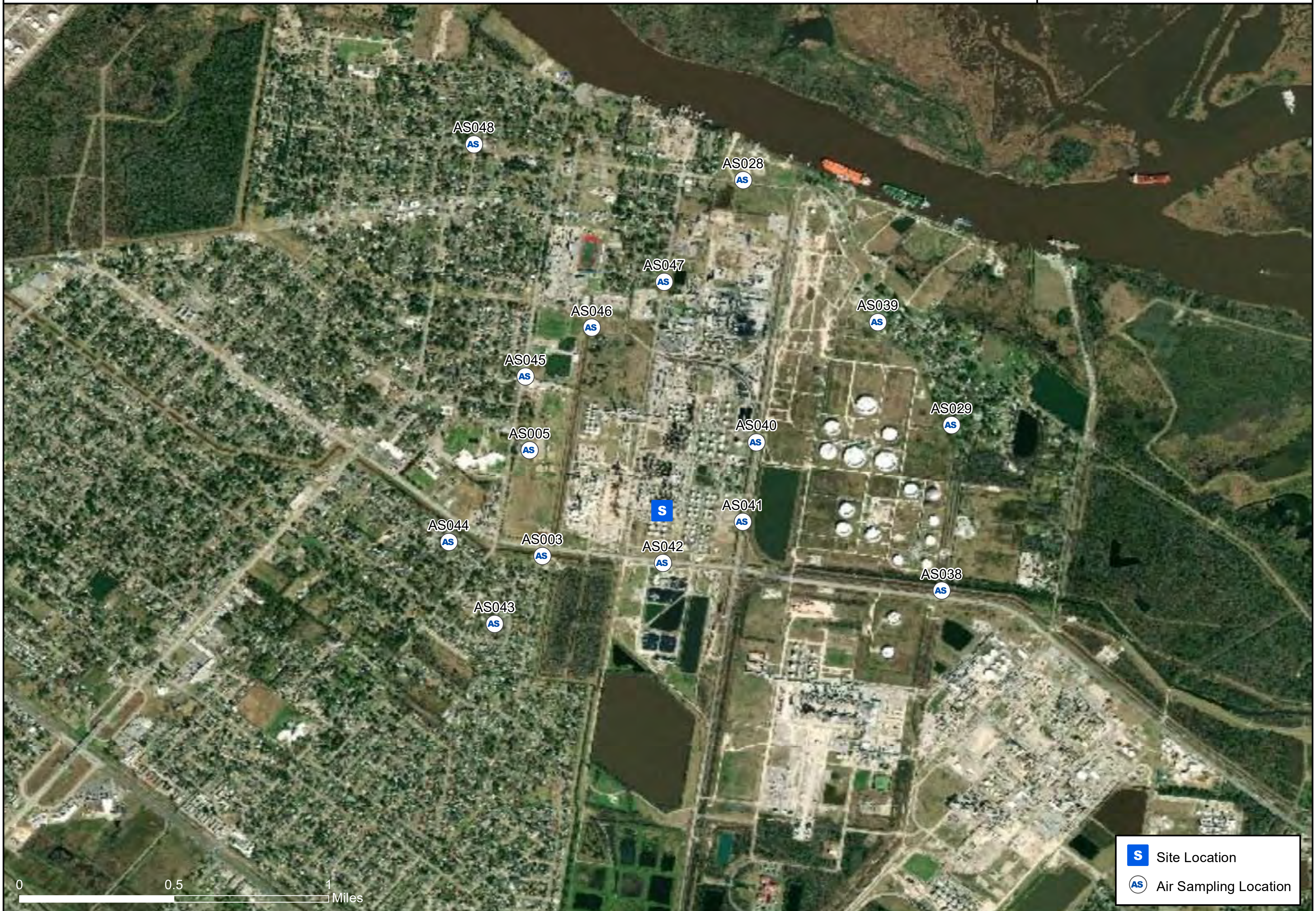
COORDINATE SYSTEM: *WGS 1984 Web Mercator Auxiliary Sphere* **DATUM:** *WGS 1984* **LAST UPDATED:** *5/14/2020 8:22:06 AM*

CTEH

Analytical Sampling Locations

South 4 Group Fire l Port Neches, TX | 12/11/2019 06:00 - 12/19/2019 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



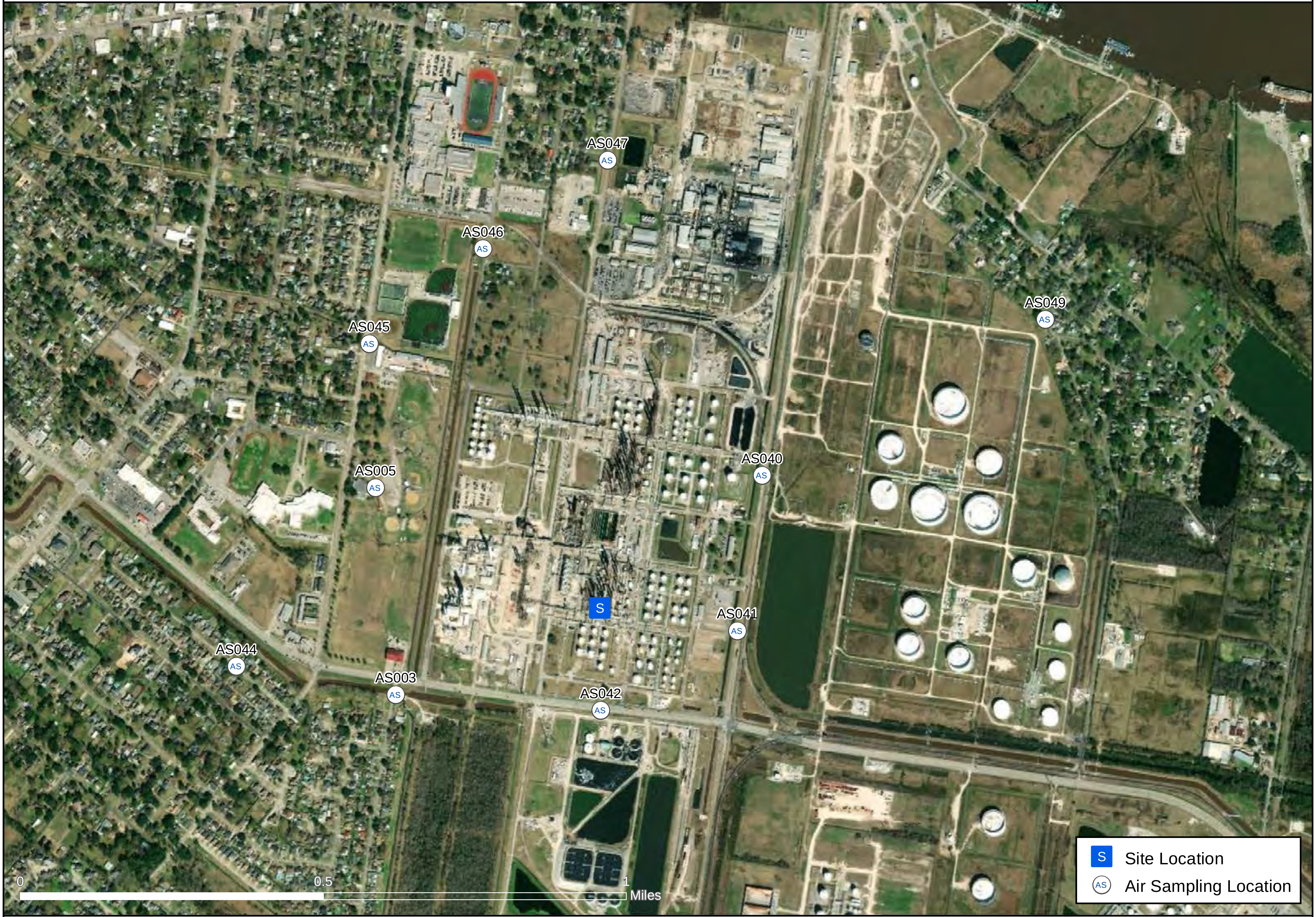
COORDINATE SYSTEM: *GCS WGS 1984* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/12/2019 7:57:54 AM*

CTEH

Analytical Sampling Locations

South 4 Group Fire l Port Neches, TX | 12/19/2019 06:00 - 1/30/2020 06:00 CST

Project:112312
Client: TPC
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 UTM Zone 15N* **DATUM:** *North American 1983* **LAST UPDATED:** *12/21/2019 10:09:30 AM*

Appendix E

Analytical Air Sampling Summary

Summary of Analytical Sampling Stations – Volatile Organic Compounds

Location	Sample Station Start Date	Sample Station Stop Date	No. of Samples Collected
AS001	Nov 27, 2019	Nov 27, 2019	1
AS002	Nov 27, 2019	Dec 10, 2019	14
AS003	Nov 27, 2019	Jan 30, 2020	62
AS004	Nov 27, 2019	Dec 10, 2019	14
AS005	Nov 27, 2019	Jan 30, 2020	61
AS006	Nov 27, 2019	Dec 10, 2019	14
AS007	Nov 27, 2019	Dec 10, 2019	14
AS008	Nov 27, 2019	Dec 10, 2019	14
AS009	Nov 27, 2019	Dec 11, 2019	15
AS010	Nov 27, 2019	Dec 01, 2019	5
AS011	Nov 27, 2019	Dec 10, 2019	14
AS012	Nov 27, 2019	Dec 10, 2019	14
AS013	Nov 27, 2019	Dec 11, 2019	15
AS014	Nov 27, 2019	Dec 01, 2019	5
AS015	Nov 27, 2019	Dec 02, 2019	5
AS016	Nov 28, 2019	Dec 01, 2019	5
AS017	Nov 28, 2019	Dec 01, 2019	4
AS018	Nov 28, 2019	Dec 01, 2019	4
AS019	Nov 28, 2019	Dec 11, 2019	14
AS020	Nov 28, 2019	Dec 10, 2019	13
AS021	Nov 28, 2019	Dec 10, 2019	13
AS022	Nov 28, 2019	Dec 10, 2019	13
AS023	Nov 30, 2019	Dec 10, 2019	12
AS024	Nov 30, 2019	Dec 10, 2019	12
AS025	Nov 30, 2019	Dec 10, 2019	11
AS026	Dec 02, 2019	Dec 10, 2019	9
AS027	Dec 02, 2019	Dec 10, 2019	9
AS028	Dec 02, 2019	Dec 19, 2019	18
AS029	Dec 02, 2019	Dec 19, 2019	18
AS030-4	Dec 03, 2019	Dec 10, 2019	8
AS030-5	Dec 03, 2019	Dec 10, 2019	8
AS031-2	Dec 03, 2019	Dec 10, 2019	8
AS032-2	Dec 03, 2019	Dec 10, 2019	8
AS037-3	Dec 08, 2019	Dec 08, 2019	1
AS038	Dec 11, 2019	Dec 19, 2019	9
AS039	Dec 11, 2019	Dec 19, 2019	9
AS040	Dec 11, 2019	Jan 30, 2020	52
AS041	Dec 11, 2019	Jan 30, 2020	51

Location	Sample Station Start Date	Sample Station Stop Date	No. of Samples Collected
AS042	Dec 11, 2019	Jan 30, 2020	52
AS043	Dec 11, 2019	Dec 19, 2019	9
AS044	Dec 11, 2019	Jan 30, 2020	53
AS045	Dec 11, 2019	Jan 30, 2020	52
AS046	Dec 11, 2019	Jan 30, 2020	53
AS047	Dec 11, 2019	Jan 30, 2020	52
AS048	Dec 11, 2019	Dec 19, 2019	9
AS049	Dec 20, 2019	Jan 30, 2020	42
Total Numbers			898

Summary of Analytical Sampling Stations – Polycyclic Aromatic Hydrocarbons (PAHs)

Location	Sample Station Start Date	Sample Station Stop Date	No. of Samples Collected
AS002	Dec 01, 2019	Dec 10, 2019	20
AS003	Dec 02, 2019	Dec 10, 2019	19
AS004	Nov 30, 2019	Dec 10, 2019	21
AS005	Dec 02, 2019	Dec 10, 2019	18
AS006	Nov 30, 2019	Dec 10, 2019	23
AS007	Nov 30, 2019	Dec 10, 2019	22
AS008	Nov 30, 2019	Dec 10, 2019	22
AS009	Nov 30, 2019	Dec 10, 2019	23
AS010	Dec 01, 2019	Dec 01, 2019	1
AS011	Nov 30, 2019	Dec 10, 2019	23
AS012	Nov 30, 2019	Dec 10, 2019	22
AS013	Dec 01, 2019	Dec 10, 2019	20
AS014	Dec 01, 2019	Dec 01, 2019	1
AS015	Dec 01, 2019	Dec 01, 2019	1
AS016	Dec 01, 2019	Dec 01, 2019	1
AS017	Dec 01, 2019	Dec 01, 2019	1
AS018	Dec 01, 2019	Dec 01, 2019	1
AS019	Nov 30, 2019	Dec 11, 2019	23
AS020	Nov 30, 2019	Dec 10, 2019	24
AS021	Nov 30, 2019	Dec 10, 2019	23
AS022	Nov 30, 2019	Dec 10, 2019	21
AS023	Nov 30, 2019	Dec 10, 2019	23
AS024	Nov 30, 2019	Dec 10, 2019	23
AS025	Nov 30, 2019	Dec 10, 2019	22
AS026	Dec 01, 2019	Dec 10, 2019	21

Location	Sample Station Start Date	Sample Station Stop Date	No. of Samples Collected
AS027	Dec 02, 2019	Dec 10, 2019	19
AS028	Dec 02, 2019	Dec 10, 2019	19
AS029	Dec 02, 2019	Dec 10, 2019	18
Total Numbers			475

Summary of Asbestos Analytical Sampling Stations

Location	Sample Station Start Date	Sample Station Stop Date	No. of Samples Collected
AS002	Nov 29, 2019	Dec 11, 2019	27
AS003	Dec 03, 2019	Jan 30, 2020	122
AS004	Nov 29, 2019	Dec 11, 2019	23
AS005	Dec 03, 2019	Dec 17, 2019	120
AS006	Nov 28, 2019	Dec 11, 2019	25
AS007	Nov 28, 2019	Dec 11, 2019	26
AS008	Nov 28, 2019	Dec 11, 2019	27
AS009	Nov 28, 2019	Dec 11, 2019	27
AS010	Nov 28, 2019	Dec 02, 2019	7
AS011	Nov 28, 2019	Dec 11, 2019	25
AS012	Nov 28, 2019	Dec 11, 2019	26
AS013	Nov 28, 2019	Dec 11, 2019	26
AS014	Nov 28, 2019	Dec 02, 2019	8
AS015	Nov 28, 2019	Dec 02, 2019	7
AS016	Nov 28, 2019	Dec 02, 2019	7
AS017	Nov 28, 2019	Dec 02, 2019	7
AS018	Nov 28, 2019	Dec 02, 2019	7
AS019	Nov 28, 2019	Dec 11, 2019	27
AS020	Nov 29, 2019	Dec 11, 2019	25
AS021	Nov 29, 2019	Dec 11, 2019	25
AS022	Nov 29, 2019	Dec 11, 2019	23
AS023	Nov 30, 2019	Dec 11, 2019	22
AS024	Nov 30, 2019	Dec 11, 2019	22
AS025	Dec 01, 2019	Dec 11, 2019	20
AS026	Dec 01, 2019	Dec 11, 2019	21
AS027	Dec 03, 2019	Dec 11, 2019	19
AS028	Dec 03, 2019	Dec 17, 2019	38
AS029	Dec 02, 2019	Dec 16, 2019	36
AS033	Dec 05, 2019	Dec 11, 2019	9
AS034	Dec 05, 2019	Dec 11, 2019	11
AS035	Dec 05, 2019	Dec 11, 2019	10
AS036	Dec 05, 2019	Dec 11, 2019	9
AS038	Dec 11, 2019	Dec 20, 2019	19

Location	Sample Station Start Date	Sample Station Stop Date	No. of Samples Collected
AS039	Dec 11, 2019	Dec 20, 2019	19
AS040	Dec 11, 2019	Dec 16, 2019	103
AS041	Dec 12, 2019	Dec 16, 2019	103
AS042	Dec 12, 2019	Dec 16, 2019	103
AS043	Dec 12, 2019	Dec 17, 2019	18
AS044	Dec 12, 2019	Dec 17, 2019	102
AS045	Dec 12, 2019	Dec 17, 2019	101
AS046	Dec 12, 2019	Dec 17, 2019	104
AS047	Dec 12, 2019	Dec 17, 2019	103
AS048	Dec 12, 2019	Dec 17, 2019	18
AS049	Dec 20, 2019	Jan 30, 2020	82
Total Numbers			1,708

Appendix F

Analytical Air Sampling Laboratory Results

Appendix G – CTEH

Surface and Drinking Water Environmental Sampling Report

THE SCIENCE OF READY℠

TPC GROUP

SOUTH 4 GROUP FIRE

Surface and Drinking Water Environmental Sampling Report

Port Neches, Texas

November 27, 2019 – January 31, 2020

Project #112312

Report Submitted on June 30, 2020

Table of Contents

List of Figures

List of Tables

List of Appendices

1.0 DESCRIPTION OF THE INCIDENT AND RESPONSE

On November 27, 2019, at approximately 04:00 Central Standard Time (CST), TPC Group (TPC) contacted CTEH®, LLC (CTEH) to provide air monitoring, air sampling, environmental sampling, and toxicology support in response to an explosion and fire at the TPC Group facility located in Port Neches, Texas. The initial explosion occurred at approximately 01:00 CST on November 27, 2019. A second explosion occurred at approximately 11:45 CST on November 27, 2019. As a result of these incidents, multiple tanks containing 1,3-butadiene within the facility were compromised and on fire. On December 4, 2019, it was reported that all fires within the facility were extinguished.

Fire water runoff was produced in response to firefighting activities on-site. During the period from the initial application of water to the fire until a generator restored power at the Joint Waste Water Treatment Plant (JWWTP), water collected in the ditches and containment at the TPC site until they became full and discharged. The runoff primarily discharged through Outfall 201 to the Outfall Canal, which is the same canal into which the treated wastewater from the JWWTP discharges. The canal ultimately drains to the Neches River Basin. CTEH arrived on-site on November 27, 2019, at approximately 0800 and began collecting surface water samples at approximately 23:00 CST. Surface water sampling efforts were primarily focused on areas in proximity to outfall locations[1] to evaluate potential downstream movement of runoff from the TPC facility and neighboring industries.

CTEH developed and implemented an Environmental Sampling and Analysis Plan (ESAP, Appendix A) approved by on-site Unified Command (UC)[2] to present the basis for the collection of environmental samples (i.e., surface water)[3] and to document and quantify the potential release of chemicals, if any, associated with the incident. Initial objectives of environmental sampling included the collection of baseline surface water samples, the delineation of potentially impacted surface water at locations on-site and downstream of the facility, and the identification of compounds of interest related to the impacted tanks, firefighting foam, and fire water runoff. In addition to the ESAP, CTEH developed a Drinking Water Sampling Plan (Appendix B) to assess the impact, if any, to downstream drinking water sources. To assist in the site cleanup and remediation operations, surface water and drinking water sample results were

---

[1]Texas Commission on Environmental Quality (TCEQ) defines an "outfall" as "*a point source where storm water runoff associated with industrial activity, and certain non-storm water discharges listed [in this permit], exits the facility and discharge(s) to surface water in the state or a municipal or private separate storm sewer system.*"
(TCEQ General Permit to Discharge Wastes, 2006;
https://www.tceq.texas.gov/assets/public/permitting/waterquality/attachments/stormwater/txr05access.pdf)

[2]Unified Command (UC) was comprised of federal, state, and local agencies, including the United States Environmental Protection Agency (USEPA), Texas Commission on Environmental Quality (TCEQ), Jefferson County Emergency Management, and TPC Group.

[3] Whereas soil sampling was proposed in the ESAP, it was not conducted based on the requests of Unified Command.

compared to health-protective screening levels established by the Texas Commission on Environmental Quality (TCEQ) and/or the United States Environmental Protection Agency (USEPA).

CTEH initiated the collection of surface water samples on November 27, 2019 and concluded sampling on January 31, 2020. Appendix C includes a site location map and an environmental sampling location map, including surface and drinking water sample locations. This report summarizes environmental surface water and drinking water sampling with respect to human health[4] conducted by CTEH at locations on-site and in proximity to the TPC Group facility in Port Neches, Texas.

2.0 METHODOLOGY

Environmental sampling consisted of collecting surface water samples to document and quantify the presence of compounds of interest within the surrounding surface waters near the initial incident location and in areas downstream of the facility from various outfall locations. Drinking water samples were collected from inside the City of Port Neches Water Plant located downstream of the TPC facility. All samples were collected in accordance with their respective sampling methods as outlined in the ESAP (Appendix A) and Drinking Water Sampling Plan (Appendix B). These plans were submitted and approved by the on-site UC, which included local, state, and federal representatives[5].

CTEH personnel submitted surface and drinking water samples to Pace Analytical Services, LLC (Pace)[6], a laboratory accredited by the National Environmental Laboratory Accreditation Program (NELAP) and by TCEQ, for analysis. Additionally, site-specific baseline samples were collected at locations near and upstream of the facility. Samples designated as baseline (WS000, WS009, WS011) were submitted to Pace and Earth Analytical Sciences (EAS) for analysis. Samples were also submitted to EMSL Analytical, an American Industrial Hygiene Association (AIHA)-accredited laboratory, to assess for the presence of asbestos fibers. Samples were contained, preserved, and handled in accordance with USEPA specifications, consistent with the sample method. All samples were maintained under chain of custody (COC) from the time of sample collection until samples were analyzed. Evidence of collection, shipment, laboratory receipt, and laboratory custody were documented for each sample.

Sampling efforts were carried out in conjunction with appropriate quality assurance (QA) procedures. Level II data verification was conducted by Environmental Standards, Inc., a third-party data validation auditing group, on all of the analytical samples collected. Level II data verification is a systematic process that reviews sample chain-of-custody, holding time, and laboratory QA checks. Level IV data validation

[4] For the purposes of this report, ecological receptors will not be discussed.
[5] The Drinking Water Sampling Plan was verbally approved by federal and state representatives as part of the signed Environmental Sampling and Analysis Plan (Appendix A).
[6] During the initial phase of sampling efforts (through December 9, 2019), replicate samples collected were also sent to Earth Analytical Sciences (EAS) at the request of TPC. Sampling results from EAS were submitted to TPC.

was conducted on at least 10% of the samples. Level IV is Tier II data validation that includes checks for internal consistency, transmittal errors, and verification of laboratory capability. Additionally, the data are reviewed for detection limits, calibration records, target compound results, and sample results.

2.1 Surface and Drinking Water Sampling Methods

CTEH collected 261 surface water samples from 20 locations and 11 drinking water samples from one location from November 27, 2019 through January 31, 2020[7]. Initial surface water sampling was conducted twice daily from November 28, 2019, through December 11, 2019. Following the approval of an Environmental Sampling Reduction Plan (Appendix A) by UC on December 11, 2019, asbestos analysis was discontinued, and surface water sampling was reduced to daily sampling from December 12, 2019, through December 19, 2019. On December 20, 2019, TCEQ verbally approved adjusting sampling efforts to weekly sampling events, which were performed until January 31, 2020. Water samples were taken from locations upstream of the incident discharge site at the Huntsman dock (WS000), Collier's Ferry Park (WS009) in Beaumont, Texas, and the TPC water intake location on the Neches river (WS011), as potential baseline sampling locations to aid in the evaluation of site-specific sampling data. Surface water samples were collected from permitted outfalls for TPC and neighboring facilities (WS001, WS002, WS015, WS017), water retention sites and effluents (WS005, WS010, WS014, WS022), all canals associated with the JWWTP runoff (WS003, WS004, WS006, WS016, WS021, WS023, WS024), the raw water intake for the city of Port Neches (WS007), and the final permitted discharge location (WS002). Drinking water samples were collected from a faucet inside the City of Port Neches Water Plant (WS008) from December 17, 2019, through January 19, 2020. A description of sample locations is provided in Table 2.1.1. Maps of surface water sample locations and water flow patterns are provided in Appendix C. A full list of each surface water and drinking water sample collected, including sample location, date collected, sample identification number, and sample type, is provided in Appendix D.

Table 2.1.1 Surface Water Sampling Locations and Descriptions[1]

Location Code	Location Description	Samples Collected	Sample Start Date	Sample End Date
WS000	Baseline; Huntsman Dock at Neches River; NE of TPC	1	11/27/2019	11/27/2019
WS001	Port Neches Atlantic Road; downstream from Outfall 001 (permitted discharge location)	23	11/29/2019	12/9/2019
WS002	Water Treatment Wetlands Outlet; Outfall 004 (permitted discharge location)	37	11/29/2019	1/31/2020
WS003	Orchard Avenue on Bridge over 001 Canal	42	11/29/2019	1/31/2020
WS004	Outfall 001 canal by Huntsman ditch cut, N. of Hogaboom Rd at Pure Atlantic Rd / Hwy 366; Outfall 001 (permitted discharge location)	22	11/29/2019	12/9/2019

[7] One sample was collected on November 27, 2019 as baseline samples and were analyzed by EAS. All subsequent surface water sampling related to the incident was conducted after November 28, 2019 and analyzed by Pace.

Location Code	Location Description	Samples Collected	Sample Start Date	Sample End Date
WS005	South of Facility; pond parallel to Hwy 366	1	11/29/2019	11/29/2019
WS006	N. of Hwy 366 in a Controlled Level Water Structure; Outfall 001 canal	38	11/29/2019	1/30/2020
WS007	N. end of **Lower Neches Valley Authority** (LNVA) Canal to City of Port Neches; Park St. E. of Baseball Field; raw water (pre-treatment drinking water source)	1	11/29/2019	11/29/2019
WS008*	City of Port Neches Water Plant at Drinking Water Faucet	11	11/30/2019	1/19/2020
WS009	Baseline sample; Upstream of site; Collier's Ferry Park, S. of Boat Ramp, Beaumont, TX	9	12/1/2019	1/18/2020
WS010	TPC effluent to Joint Wastewater Treatment Plant (JWWTP); S. of 366	21	12/1/2019	1/30/2020
WS011	Baseline sample; TPC Dock; water inlet	1	12/2/2019	12/2/2019
WS014	S. of TPC facility at drainage culvert; ditch perpendicular to Hwy 366; JWWTP discharge from polishing ponds	16	12/3/2019	1/30/2020
WS015	Outfall 201 (Permitted discharge); SE corner of TPC facility	8	12/4/2019	12/9/2019
WS016	Huntsman ditch at Port Neches Atlantic Rd; Division E	2	12/6/2019	12/10/2019
WS017	Outfall 301; JWWTP holding pond (permitted discharge location)	21	12/5/2019	1/30/2020
WS021	Upstream of Huntsman ditch	1	12/8/2019	12/8/2019
WS022	W002 Block 6 Pond, NE of incident site	1	12/8/2019	12/8/2019
WS023	Neches River downstream of confluence with Molasses Bayou	12	12/11/2019	1/18/2020
WS024	Molasses Bayou between Neches River and Port Neches Atlantic Rd.	4	12/11/2019	12/14/2019
Total		272		

NA = Not Applicable
*WS008 = drinking water location
[1]Samples collected at WS012, WS013, WS018, WS019, and WS020 were product samples and thus not included in this report.

Surface water samples were collected in laboratory-supplied sampling containers. Surface water samples were analyzed for the following constituents: volatile organic compounds (VOCs) including 1,3-butadiene, semi-volatile organic compounds (SVOCs), ethylene glycol, Texas Total Petroleum Hydrocarbons (TX-TPH), perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA); perfluorohexanesulfonate (PFHxS), total organic carbon (TOC), oil and grease, and asbestos in accordance with the methods listed in the ESAP, as summarized in Table 2.1.2. Drinking water samples were analyzed for VOCs and SVOCs in accordance with the methods listed in the ESAP and the Drinking Water Sampling Plan, as summarized in Table 2.1.3. Because 1,3-butadiene is not a target analyte reported via USEPA drinking water methods, drinking water samples were also analyzed via EPA SW-846 8260b. Based on sample results collected and evaluated by representatives of the UC and day-to day remedial activities, the frequency, locations, and compounds of interest were adjusted throughout the duration of the response as recommended and approved by UC.

Table 2.1.2 Surface Water Sample Analytical Methods

Analysis	Method
Volatile Organic Compounds (VOCs) + TICs	EPA SW-846 8260b
Semi-volatile Organic Compounds (SVOCs)	EPA SW-846 8270c (SCAN + SIM) 17 PAH
Ethylene Glycol	US EPA Method 8015C
Texas Total Petroleum Hydrocarbon (TX-TPH)	TX-1005
PFOS, PFOA, PFHxS	EPA 537M
Total Organic Carbon (TOC)	SM 5310B
Oil and Grease	US EPA Method 1664A
Asbestos	EPA 100.2

Table 2.1.3 Drinking Water Sample Analytical Methods

Analysis	Method
Volatile Organic Compounds (VOCs) + TICs	EPA 524.2
Semi-volatile Organic Compounds (SVOCs)	EPA 525.2

Sample identification was established using the following nomenclature:

- PNTX = Port Neches, Texas
- Date = month(xx)day(xx)
- V/X/Y = (V: Surface Water Duplicate; X: Surface Water; Y: Baseline)
- DW/DV = (DW: Drinking Water; DV: Drinking Water Duplicate)

Furthermore, samples that were collected twice per day from the same location were designated suffixes of "A" or "B" to indicate morning and afternoon samples, respectively (Example: PNTX1201X010A – surface water sample location #10, collected on December 1, 2019, in the morning.)

2.2 Surface Water Screening Criteria

Over the course of the response, surface water sampling results were compared to the following surface water screening values, when applicable.

2.2.1 TCEQ Surface Water Screening Values

The Neches River Basin near the TPC facility and the JWWTP is not classified as a drinking water source; however, activities including fishing and swimming may occur. As such, surface water sampling results were screened against either TCEQ's Tier 1 Surface Water Risk-Based Exposure Limit (RBEL) for fish only or Contact Recreation Water Protective Concentration Levels (PCLs), when available. According to the Texas Risk Reduction Program (TRRP), "*…when a water body is not classified as a drinking water source,* *the Texas Surface Water Quality Standards (TSWQS) allow surface water quality standards to be set based solely on consideration of uptake of COCs into fish/shellfish and aquatic life criteria and it may be necessary to evaluate contact recreation (i.e., incidental ingestion and dermal contact with surface water)*[8]*."* Both the Surface Water RBELs and Contact Recreation Water PCLs were utilized, as appropriate, for comparisons to the average surface water sampling results by location; the use of the RBEL or PCL was determined based on the potential for either dermal contact and incidental ingestion of surface water (PCLs) or fish consumption (RBELs) at the specific sampling location.

TCEQ defines PCLs as "*the concentration of a compound of concern which can remain within the source medium and not result in levels that exceed the applicable human health RBEL [or ecological PCL] at the point of exposure for that exposure pathway.*[9]" TCEQ Contact Recreation Water PCLs were utilized as screening values designed for evaluating potential exposure pathways relevant to surface water including dermal contact and incidental ingestion of surface water. For surface water sampling locations found within the TPC facility and the JWWTP that are not accessible to the public and are not considered public state waters (i.e., WS005, WS006, WS010, WS014, WS015, WS017, WS022), Contact Recreation Water PCLs were utilized for comparison. For the incidental ingestion component of Contact Recreation Water PCLs, TCEQ utilized Tier 1 exposure factors (i.e., exposure duration, body weight) and TRRP exposure-specific parameters (i.e., exposure frequency, incidental surface water ingestion rate) in the generation of these screening values. TCEQ also evaluated dermal exposures to surface water by utilizing the USEPA equations and parameters provided in the *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)* in the development of Contact Recreation Water PCLs. Both incidental ingestion and dermal contact exposure pathways assume conservative exposure parameters, such as an exposure duration of six years, exposure frequency of 39 days per year, and a length of surface water contact at three hours per event. Furthermore, because the surface waters within and in proximity to the TPC facility are not classified as potable sources, surface water sampling results were compared to Contact Recreation PCLs. It is important to note that it is unlikely individuals will swim at these surface water locations. As such, utilizing Contact Recreation Water PCLs is a conservative (i.e., health-protective) approach for evaluating surface water sampling results at locations that are not accessible to the public. If a detected analyte did not have an established Contact Recreation Water PCL, results were compared to its respective Human Health RBEL, when available. Available Contact Recreation Water PCLs for potential incident-related compounds of interest are provided in Table 2.2.1.

---

[8]"Contact Recreation Water PCLs," TCEQ, 2006: https://www.tceq.texas.gov/assets/public/remediation/trrp/contactrecpcls.pdf

[9] Texas Risk Reduction Program (TRRP), 2007: https://www.tceq.texas.gov/assets/public/comm_exec/pubs/rg/rg-366-trrp-24.pdf

Table 2.2.1 TCEQ Contact Recreation Water PCL Screening Values[1]

Sampling Locations	Analyte[2]	Screening Value[3]	Units
WS005, WS006, WS010, WS014, WS015, WS017, WS022	Benzene	235	µg/L
	Ethylbenzene	12,800	µg/L
	Ethylene glycol	1,840,000	µg/L
	Naphthalene	2,550	µg/L
	o-Xylene	227,000	µg/L
	Tert-butyl methyl ether (MTBE)	5,470	µg/L
	Toluene	16,500	µg/L
	Xylene	24,000	µg/L

[1] Contact Recreation Water PCL is not available for 1,3-butadiene.
[2] Compounds of interest without Contact Recreation Water PCLs were compared to Human Health RBELs, when available.
[3]Tier 1 Contact Recreation Water PCL (TCEQ, 2006)
µg/L = micrograms per liter.

Based on recommendations by UC, including input from TCEQ and USEPA, he Human Health Surface Water RBELs for freshwater fish only were selected for analysis of surface water samples from locations with the potential for public access and activities such as fishing (i.e., WS001, WS002, WS003, WS004, WS007, WS016, WS021, WS023, WS024). According to the TRRP, these screening values were developed to be "*freshwater criteria to prevent contamination of fish and other aquatic life to ensure that they are safe for human consumption.*"[10] These RBELs apply to freshwater which have sustainable fisheries, and which are not designated or used for public water supply. Sustainable fisheries, are defined by the TRRP as "*perennial streams with a stream order of three or greater…all bays, estuaries, and tidal rivers,…all other waters that potentially have sufficient fish production or fishing activity to create significant long-term (sustainable) human consumption of fish*."[11] As the surface waters between the JWWTP and the Neches River are not used as long-term fish production sources, comparison to the RBEL for freshwater fish would be conservative and overestimate the risk associated with the actual use of these surface waters. Furthermore, while the above-listed locations may be accessible to the public, they are not considered public drinking water sources. A list of the available Surface Water RBEL screening values for potential incident-related compounds of interest is provided below in Table 2.2.2. If a compound did not have a Human Health RBEL, it was compared to the Contact Recreation Water PCL, when available.

[10] TCEQ, 2007: https://www.tceq.texas.gov/assets/public/comm_exec/pubs/rg/rg-366-trrp-24.pdf
[11] TCEQ, 2007: https://www.tceq.texas.gov/assets/public/comm_exec/pubs/rg/rg-366-trrp-24.pdf

Table 2.2.2 TCEQ Surface Water RBEL Screening Values[1]

Sampling Locations	Analyte[2]	RBEL Screening Value[3]	Units
WS001, WS002, WS003, WS004, WS007, WS016, WS021, WS023, WS024	Benzo(a)anthracene	0.025	µg/L
	Benzo(a)pyrene	0.0025	µg/L
	Benzo(b)fluoranthene	0.013	µg/L
	Benzo(k)fluoranthene	0.13	µg/L
	Dibenz(a,h)anthracene	0.0013	µg/L
	Indeno(1,2,3-cd)pyrene	0.013	µg/L
	Benzene	581	µg/L
	Ethylbenzene	1,867	µg/L
	Ethylene glycol	16,800,000	µg/L
	Tert-butyl methyl ether (MTBE)	10,482	µg/L
	Toluene	1,000	µg/L

[1]Human Health RBEL for freshwater (fish only) is not available for 1,3-butadiene
[2]Compounds without Human Health RBELs were compared to Contact Recreation Water PCLs, when available.
[3]Human Health RBEL for freshwater (fish only) (TCEQ, 2018)
µg/L = micrograms per liter.

2.2.2 Other Applicable Screening Values

Some compounds of interest do not have applicable TCEQ Contact Recreation Water PCLs or Surface Water RBELs. Water sampling results for these compounds were compared to available TCEQ screening values or USEPA water quality criteria as a reference. Surface water sampling results for PFOS and PFOA at WS007 were compared to the USEPA drinking water advisory levels for these compounds, which is 70 parts per trillion (ppt; ng/L)[12], as this location is a raw water intake at the Lower Neches Valley Authority (LNVA) Canal for the City of Port Neches. For all other surface water sampling locations, PFOS and PFOA results were compared to the available TCEQ Groundwater PCLs[13]. A screening value of 7.0 million fibers/L was selected for asbestos fibers in surface water samples based on the USEPA National Primary Drinking Water Regulations[14]; however, it should be noted that this is a very conservative value, given that the surface water locations sampled within and in proximity to the TPC facility are not intended to be used as a source of drinking water. The selection and use of these additional screening values was agreed upon by members of UC. The USEPA water quality criteria are developed based on equations using reverse risk assessment methodologies that back-calculate an acceptable contaminant concentration based on conservative, health-protective parameters to protect the general population over a lifetime. For example, the USEPA assumes a drinking water consumption of 2.4 liters per day for adults for a 70-year lifetime[15]. As the surface waters in proximity to the TPC facility would not be considered a potable source that an individual would use or consume for an entire lifetime, it is clear that the USEPA drinking water

[12] USEPA, 2018: https://www.epa.gov/sites/production/files/2018-03/documents/dwtable2018.pdf
[13] TRRP Protective Concentration Levels (TCEQ, 2019)
[14] USEPA, 2009:
https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations
[15] USEPA, 2017: https://www.epa.gov/sites/production/files/2014-10/documents/handbook-chapter3.pdf

criteria will likely overestimate risk in this scenario. Nevertheless, USEPA drinking water criteria were used as conservative reference points to assess whether further action was needed (i.e., additional cleanup). In the absence of state or federal screening values for remaining analytes, average results were compared to results of water samples collected upstream of the facility.

It should be noted that there currently are no applicable screening values for 1,3-butadiene in surface or drinking water due to its physical and chemical properties that lead to rapid volatilization from water. As stated in the European Commission's Summary Risk Assessment Report for 1,3-butadiene, "*Volatility from water is expected to be rapid…The fate of 1,3-butadiene in wastewater treatment was estimated as 95% volatilized*[16]..." Further, the ATSDR states, "*Exposure to 1,3-butadiene through ingestion of food and drinking water is expected to be very low compared to exposure through breathing contaminated air*[17]." A list of the above-mentioned applicable screening values for asbestos, PFOA, and PFOS is provided below in Table 2.2.3.

Table 2.2.3 Other Applicable Surface Water Screening Values

Analyte	Screening Values	Units
Asbestos	7.0[1]	million fibers/L
1,3-Butadiene[2]	--	--
PFOA	70[3]; 290[4]	ng/L
PFOS	70[3]; 560[4]	ng/L

[1]USEPA National Primary Drinking Water Regulations (USEPA, 2009)
[2]No applicable screening values for 1,3-butadiene in surface waters due to its rapid volatilization in water.
[3]USEPA drinking water advisory (USEPA, 2018)
[4]TCEQ Groundwater Protective Concentration Level (TCEQ, 2019)

2.3 Drinking Water Screening Criteria

Results from drinking water samples were averaged and compared to applicable health-protective screening values, where available, or compared to baseline sample concentrations.

Water samples analyzed as drinking water sources were screened against the available TCEQ Tier 1 Groundwater PCLs for residential ingestion ($^{GW}GW_{ING}$) for Class 1 groundwater and USEPA Drinking Water Maximum Contaminant Levels (MCLs). Class 1 groundwater resources are those that are considered usable, or potentially usable, drinking water sources[18]. Residential Groundwater PCLs are based on USEPA primary MCLs, when available, or are calculated based on the toxicity of the compound of interest, exposure, and acceptable risk and hazard levels[19]. According to the USEPA, primary MCLs "*the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using*

[16] ECHA, 2002: https://echa.europa.eu/documents/10162/cf3931bd-8b42-49e2-a0b9-4acc71a37375
[17] ATSDR, 2012: https://www.atsdr.cdc.gov/ToxProfiles/tp28.pdf
[18] TCEQ, 2010; https://www.tceq.texas.gov/assets/public/comm_exec/pubs/rg/rg-366-trrp-08.pdf
[19] TCEQ, 2013: https://www.tceq.texas.gov/assets/public/comm_exec/pubs/rg/rg-366-trrp-22.pdf

the best available treatment technology and taking cost into consideration."[20]. Similar to other health-based screening values, MCLs assume daily exposure to compounds of interest for prolonged periods of time. Thus, comparing MCLs to the average concentrations of these compounds over an entire sampling period is more representative of the potential for exposure in comparison to evaluating a single sample. As such, average results for drinking water samples were compared to the available TCEQ PCLs and USEPA MCLs for compounds of interest, which are provided below in Table 2.3.1.

Table 2.3.1 Drinking Water Screening Values[1]

Analyte	TCEQ Groundwater PCL (Residential)[2]	USEPA Primary MCL	Units
1,2-Dichloroethane	5	5	µg/L
Benzene	5	A	µg/L
Ethylbenzene	700	700	µg/L
Tert-butyl methyl ether	240	NA	µg/L
PFOA	0.290 (290)	NA	µg/L
PFOS	0.560 (560)	NA	µg/L
Tetrachloroethene	5	5	µg/L
Xylenes (m, p, & o)	10	10	µg/L
Total trihalomethanes (TTHM)	80	80	µg/L

NA = Not Available
[1]There are no available drinking water screening values for 1,3-butadiene.
[2]TCEQ Groundwater PCLs are based off of USEPA Primary MCLs, when available.

3.0 RESULTS AND DISCUSSION

Discussions of the results for surface water and drinking water samples are provided in the sections below. A full summary of surface water laboratory results is provided in Appendix E. A summary of drinking water laboratory results is provided in Appendix F. All corresponding laboratory reports are available upon request.

3.1 Surface Water Sampling Results

Surface water sampling results were compared to applicable health-based screening values, as described in Section 2.2. As these screening values were developed to evaluate potential long-term or frequent exposures, the average concentration of each constituent was evaluated by location for comparison purposes from November 27, 2019, through January 31, 2020. Results reported below detection limits

[20] USEPA, 2009: https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

were included in the average calculations by taking one-half of the detection limit, consistent with USEPA risk assessment guidance[21].

3.1.1 Evaluation of TCEQ Protective Concentration Limits

Results from samples collected at locations WS005, WS006, WS010, WS014, WS015, WS017, and WS022 were averaged over time by sample location and compared to Contact Recreation Water PCLs, as these locations were evaluated for the potential for dermal exposure and incidental ingestion of surface waters. Detections for compounds of interest were compared to TCEQ Contact Recreation Water PCLs in Table 3.1.1. Additionally, PFOA and PFOS compounds were compared to the available TCEQ Residential Groundwater PCLs (Table 3.1.2).

Table 3.1.1 Contact Recreation Water PCL Detection Summary for Compounds of Interest

Location	Analyte	# of Samples	# of Detections	Baseline Range[1] (µg/L)	PCL Screening Value[2] (µg/L)	Average Result[3] (µg/L)
WS005	Ethylene Glycol	1	1	< 200 – 768(J)	1,840,000	311
	Toluene	1	1	< 0.2 - < 0.7	16,500	1.36
WS006	1,3-Butadiene	38	14	< 0.5 - < 0.8	n/a ‡	11.5
	Benzene	38	12	< 0.2 - < 0.7	235	0.627
	Ethylbenzene	38	11	< 0.2 - < 0.2	12,800	0.349
	Ethylene Glycol	38	17	< 200 - 768(J)	1,840,000	251
	Naphthalene	38	29	< 0.013 - 0.064(J)	2,550	0.626
	o-Xylene	38	5	< 0.2 - 0.271(J)	227,000	0.273
	Styrene	38	11	< 0.2 - < 0.8	29,800	0.596
	Tert-butyl methyl ether (MTBE)	38	38	< 0.2 - < 0.2	5,470	101.7
	Toluene	38	3	< 0.2 - < 0.7	16,500	0.252
	Xylene (total)	38	6	< 0.4 - 0.87(J)	24,000	0.680
WS010	1,3-Butadiene	21	18	< 0.5 - < 0.8	n/a ‡	69.6
	Benzene	21	12	< 0.2 - < 0.7	235	2.30
	Ethylbenzene	21	21	< 0.2 - < 0.2	12,800	330.0
	Ethylene Glycol	21	18	< 200 -	1,840,000	1,030

[21] USEPA Regional Guidance on Handling Chemical Data Near the Detection Limit in Risk Assessments; https://www.epa.gov/risk/regional-guidance-handling-chemical-concentration-data-near-detection-limit-risk-assessments)

Location	Analyte	# of Samples	# of Detections	Baseline Range[1] (µg/L)	PCL Screening Value[2] (µg/L)	Average Result[3] (µg/L)
				768(J)		
	Naphthalene	21	20	< 0.013 - 0.064(J)	2,550	2.76
	o-Xylene	21	4	< 0.2 - 0.271(J)	227,000	1.260
	Styrene	21	21	< 0.2 - < 0.8	29,800	1,074
	Tert-butyl methyl ether (MTBE)	21	15	< 0.2 - < 0.2	5,470	536.7
	Toluene	21	7	< 0.2 - < 0.7	16,500	1.40
	Xylene (total)	21	6	< 0.4 - 0.87(J)	24,000	2.62
WS014	1,3-Butadiene	16	1	< 0.5 - < 0.8	n/a ‡	0.275
	Ethylene Glycol	16	6	< 200 - 768(J)	1,840,000	241
	Styrene	16	1	< 0.2 - < 0.8	29,800	0.109
WS015	1,3-Butadiene	8	8	< 0.5 - < 0.8	n/a ‡	108.6
	Benzene	8	8	< 0.2 - < 0.7	235	2.24
	Ethylbenzene	8	8	< 0.2 - < 0.2	12,800	3.40
	Ethylene Glycol	8	3	< 200 – 768(J)	1,840,000	249
	Naphthalene	8	8	< 0.013 - 0.064(J)	2,550	0.501
	o-Xylene	8	7	< 0.2 - 0.271(J)	22,7000	0.527
	Styrene	8	8	< 0.2 - < 0.8	29,800	2.22
	Tert-butyl methyl ether (MTBE)	8	8	< 0.2 - < 0.2	5,470	26.9
	Xylene (total)	8	8	< 0.4 - 0.87(J)	24,000	1.46
WS017	1,3-Butadiene	21	5	< 0.5 - < 0.8	n/a ‡	0.801
	Benzene	21	1	< 0.2 - < 0.7	235	0.188
	Ethylbenzene	21	1	< 0.2 - < 0.2	12,800	0.201
	Ethylene Glycol	21	12	< 200 - 768(J)	1,840,000	274
	Naphthalene	21	9	< 0.013 - 0.064(J)	2,550	0.082
	Styrene	21	4	< 0.2 - < 0.8	29,800	0.257
	Tert-butyl methyl ether (MTBE)	21	21	< 0.2 - < 0.2	5,470	143.0

Location	Analyte	# of Samples	# of Detections	Baseline Range[1] (µg/L)	PCL Screening Value[2] (µg/L)	Average Result[3] (µg/L)
WS022	1,3-Butadiene	1	1	< 0.5 - < 0.8	n/a ‡	39.7
	Benzene	1	1	< 0.2 - < 0.7	235	1.46
	Ethylbenzene	1	1	< 0.2 - < 0.2	12,800	331
	Naphthalene	1	1	< 0.013 - 0.064(J)	2,550	0.691
	Styrene	1	1	< 0.2 - < 0.8	29,800	971
	Tert-butyl methyl ether (MTBE)	1	1	< 0.2 - < 0.2	5,470	21.8
	Toluene	1	1	< 0.2 - < 0.7	16,500	1.01
	Xylene (total)	1	1	< 0.4 - 0.87(J)	24,000	1.21

[1]Baseline range is based on samples collected upstream of the facility (WS000, WS009, and WS011). If result is a non-detect, the method detection limit is reported preceded by the "<" symbol.
[2]TCEQ Contact Recreation Water PCL
[3]Average is approximate. Includes results below reporting limit, and ½ of the method detection limit (MDL) where the analyte was not detected.
(J) Quantitation is approximate.
‡ No PCL Available.

Table 3.1.2 Tier 1 Groundwater PCL Detection Summary for PFOA/PFOS

Location	Analyte	# of Samples	# of Detections	Baseline Range[1] (ng/L)	PCL Screening Value[2] (ng/L)	Average Result[3] (ng/L)
WS001	PFOA	23	23	< 1.5 - 1.86(J)	290	15.02
	PFOS	23	23	< 1.42 - 6.37(J)	560	399.3
WS002	PFOA	37	37	< 1.5 - 1.86(J)	290	18.8
	PFOS	37	37	< 1.42 - 6.37(J)	560	259.5
WS003	PFOA	42	42	< 1.5 - 1.86(J)	290	20.3
	PFOS	42	42	< 1.42 - 6.37(J)	560	228.3
WS004	PFOA	21	21	< 1.5 - 1.86(J)	290	21.9
	PFOS	21	21	< 1.42 - 6.37(J)	560	223.3
WS005	PFOA	1	1	< 1.5 - 1.86(J)	290	1.87
	PFOS	1	1	< 1.42 - 6.37(J)	560	32.8
WS006	PFOA	38	37	< 1.5 - 1.86(J)	290	16.6
	PFOS	38	38	< 1.42 - 6.37(J)	560	214.1
WS010	PFOA	21	21	< 1.5 - 1.86(J)	290	13.4
	PFOS	21	21	< 1.42 - 6.37(J)	560	423
WS014	PFOA	16	2	< 1.5 - 1.86(J)	290	0.920
	PFOS	16	10	< 1.42 - 6.37(J)	560	10.1

Location	Analyte	# of Samples	# of Detections	Baseline Range[1] (ng/L)	PCL Screening Value[2] (ng/L)	Average Result[3] (ng/L)
WS015	PFOA	8	8	< 1.5 - 1.86(J)	290	8.04
	PFOS	8	8	< 1.42 - 6.37(J)	560	362.5
WS016	PFOA	1	1	< 1.5 - 1.86(J)	290	16.8
	PFOS	1	1	< 1.42 - 6.37(J)	560	128
WS017	PFOA	21	20	< 1.5 - 1.86(J)	290	15.8
	PFOS	21	21	< 1.42 - 6.37(J)	560	114.9
WS021	PFOA	1	1	< 1.5 - 1.86(J)	290	30.9
	PFOS	1	1	< 1.42 - 6.37(J)	560	174
WS023	PFOA	12	5	< 1.5 - 1.86(J)	290	1.26
	PFOS	12	8	< 1.42 - 6.37(J)	560	12.4
WS024	PFOA	4	4	< 1.5 - 1.86(J)	290	2.58
	PFOS	4	3	< 1.42 - 6.37(J)	560	15.4

[1]Baseline range is based on samples collected upstream of the facility (WS000, WS009, and WS011). If result is a non-detect, the method detection limit is reported preceded by the "<" symbol.
[2]TCEQ Tier 1 Groundwater PCL
[3]Average is approximate. Includes results below the reporting limit, and ½ of the method detection limit where the analyte was not detected.
(J) Quantitation is approximate.

In summary, there were no exceedances of applicable health-based PCL screening values at locations WS005, WS006, WS010, WS014, WS015, WS017 and WS022, as average concentrations of all compounds of interest were below corresponding Contact Recreation Water PCLs. Additionally, there were no exceedances of the TCEQ Groundwater PCLs for average PFOA or PFOS results at any sampling location. In the absence of applicable Contact Recreation Water PCLs, sampling results from these locations were compared to Human Health RBELs. Exceedances for some PAHs (were reported at WS006, WS010, WS014, WS015, and WS017) for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. These results are discussed below in Section 3.1.2.

3.1.2 Evaluation of TCEQ Risk-Based Exposure Limits

Results from samples collected at locations WS001, WS002, WS003, WS004, WS007, WS016, WS021, WS023, and WS024 were averaged by sample location and compared to surface water RBELs (fish-only) that are protective of humans that may consume fish from the location sampled. A summary table of average detections above the surface water RBELs is provided below in Table 3.1.3.

Table 3.1.3 Surface Water RBEL Exceedance Summary

Location	Analyte	# of Samples	# of Detections	Baseline Range[1] (µg/L)	RBEL Screening Value (µg/L)	Average Result[2] (µg/L)
WS001	Benzo(a)anthracene	21	8	< 0.026 - 0.077(J)	0.025	0.0623*
	Benzo(a)pyrene	21	8	< 0.013 - 0.079(J)	0.0025	0.0507*

Location	Analyte	# of Samples	# of Detections	Baseline Range[1] (µg/L)	RBEL Screening Value (µg/L)	Average Result[2] (µg/L)
	Benzo(b)fluoranthene	21	8	< 0.013 - 0.118	0.013	0.0488*
	Dibenz(a,h)anthracene	21	2	< 0.025 - < 0.028	0.0013	0.0270
	Indeno(1,2,3-cd)pyrene	21	6	< 0.013 - 0.068(J)	0.013	0.0407*
WS002	Benzo(a)anthracene	36	4	< 0.026 - 0.077(J)	0.025	0.0237*
	Benzo(a)pyrene	36	4	< 0.013 - 0.079(J)	0.0025	0.0204*
	Benzo(b)fluoranthene	36	4	< 0.013 - 0.118	0.013	0.0193*
	Dibenz(a,h)anthracene	35	4	< 0.025 - < 0.028	0.0013	0.0269
	Indeno(1,2,3-cd)pyrene	35	4	< 0.013 - 0.068(J)	0.013	0.0226*
WS003	Benzo(a)anthracene	41	31	< 0.026 - 0.077(J)	0.025	0.122
	Benzo(a)pyrene	41	30	< 0.013 - 0.079(J)	0.0025	0.130
	Benzo(b)fluoranthene	41	29	< 0.013 - 0.118	0.013	0.113*
	Dibenz(a,h)anthracene	41	4	< 0.025 - < 0.028	0.0013	0.0366
	Indeno(1,2,3-cd)pyrene	41	26	< 0.013 - 0.068	0.013	0.0823
WS004	Benzo(a)anthracene	21	12	< 0.026 - 0.077(J)	0.025	0.104
	Benzo(a)pyrene	21	12	< 0.013 - 0.079(J)	0.0025	0.0908
	Benzo(b)fluoranthene	21	12	< 0.013 - 0.118	0.013	0.0805*
	Dibenz(a,h)anthracene	20	3	< 0.025 - < 0.028	0.0013	0.0330
	Indeno(1,2,3-cd)pyrene	21	13	< 0.013 - 0.068(J)	0.013	0.0640*
WS007	Benzo(a)anthracene	1	1	< 0.026 - 0.077(J)	0.025	0.027*
	Benzo(a)pyrene	1	1	< 0.013 - 0.079(J)	0.0025	0.02*
	Benzo(b)fluoranthene	1	1	< 0.013 - 0.118	0.013	0.032*
	Dibenz(a,h)anthracene	1	1	< 0.025 - < 0.028	0.0013	0.137
	Indeno(1,2,3-cd)pyrene	1	1	< 0.013 - 0.068(J)	0.013	0.071*
WS016	Benzo(a)anthracene	1	1	< 0.026 - 0.077(J)	0.025	0.163
	Benzo(a)pyrene	1	1	< 0.013 - 0.079(J)	0.0025	0.164
	Benzo(b)fluoranthene	1	1	< 0.013 - 0.118	0.013	0.171
	Indeno(1,2,3-cd)pyrene	1	1	< 0.013 - 0.068(J)	0.013	0.117
WS023	Benzo(a)anthracene	12	1	< 0.026 - 0.077(J)	0.025	0.0155*
	Benzo(a)pyrene	12	1	< 0.013 - 0.079(J)	0.0025	0.0098*
	Benzo(b)fluoranthene	12	1	< 0.013 - 0.118	0.013	0.0098*
	Dibenz(a,h)anthracene	12	1	< 0.025 - < 0.028	0.0013	0.0170
	Indeno(1,2,3-cd)pyrene	12	1	< 0.013 - 0.068(J)	0.013	0.0111*
WS024	Benzo(a)anthracene	4	1	< 0.026 - 0.077(J)	0.025	0.016*
	Benzo(a)pyrene	4	1	< 0.013 - 0.079(J)	0.0025	0.011*
	Dibenz(a,h)anthracene	4	1	< 0.025 - < 0.028	0.0013	0.0175
	Indeno(1,2,3-cd)pyrene	4	1	< 0.013 - 0.068(J)	0.013	0.0119*

*Sample result was within background/upstream sampling range.

[1]Baseline range is based on samples collected upstream of the facility (WS000, WS009, and WS011). If result is a non-detect, the instrument method detection limit is reported preceded by the “<” symbol.

[2]If sample result is reported as a non-detection, ½ of the method detection limit (MDL) is used to calculate the average result.

(J) Quantitation is approximate.

Average results from locations compared to surface water RBELs included some exceedances for certain PAHs, as summarized in Table 3.1.2. There were no exceedances of surface water RBELs at WS021 for any PAHs. The vast majority of detections were found well within levels reported from samples collected upstream of the site during the response (i.e., WS000, WS009, WS011)[22]. A total of sixteen exceedances were reported at all sampling locations. Additionally, 21 exceedances were reported at five sampling locations that did not have Contact Recreation Water PCLs for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene (WS006, WS010, WS014, WS015, and WS017). However, it’s important to note that all average PAH results at the Neches River Outfall (WS002) were within baseline ranges and are below documented levels of PAHs in surface water throughout the United States[23]. It should also be noted all PAHs presented above with exceedances of RBELs were below their respective Groundwater PCL screening value (benzo(a)anthracene: 9.1 µg/L; benzo(a)pyrene: 0.2 µg/L; benzo(b)fluoranthene: 9.1 µg/L; dibenz(a,h)anthracene: 0.2 µg/L; and indeno(1,2,3-cd)pyrene: 9.1 µg/L). Further, there were no exceedances of Contact Recreation Water PCLs for compounds of interest that did not have Human Health RBELs. These concentrations would likely be further diluted upon entry into the Neches River Basin. Thus, there was no impact of PAHs on the Neches River Basin that would represent a hazard to human health or the environment. There were no exceedances of surface water RBELs for any other compounds of interest at any location.

3.1.3 Geospatial Trends of Compounds of Interest in Surface Waters

To evaluate patterns of product release into the Neches River Basin (at sampling location WS002), a trend graph of temporal and geospatial movement of 1,3 butadiene was generated, as shown in Figure 3.1.3. Notably, detections of 1,3-butadiene were reported during the initial days following the incident (November 28, 2019 – December 1, 2019)[24]; however, concentrations quickly decreased to below detectable levels. Detections of 1,3 butadiene were not observed to increase after the initial days of sampling. Similar trends were reported for related compounds of interest, including benzene, MTBE, PFOS, and PFOA (Appendix G).

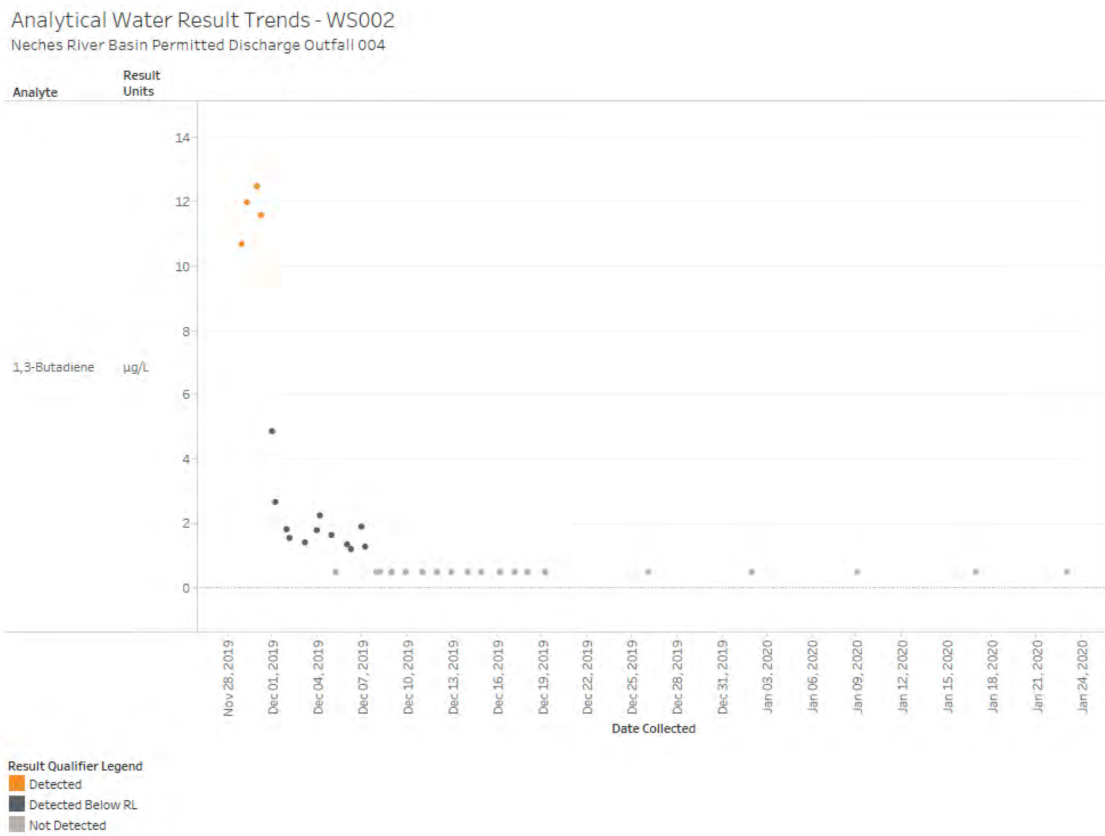
---

[22]All RBEL exceedances for WS001, WS002, WS023, and WS024 were within the reported baseline ranges for upstream sampling with the exception of dibenz(a,h)anthracene. Benzo(b)fluoranthene was within the corresponding range of upstream sampling results at all sampling locations. Indeno(1,2,3-cd)pyrene was within the baseline range at WS001, WS002, WS004, WS007, WS023, and WS024, as was benzo(a)anthracene and benzo(a)pyrene. Dibenz(a,h)anthracene was within the baseline range at WS002, WS023, and WS024.

[23]ATSDR Toxicological Profile for Polycyclic Aromatic Hydrocarbons – August 1995 (https://www.atsdr.cdc.gov/toxprofiles/tp69.pdf)

[24] Baseline surface water sampling conducted on November 27, 2019 reported no detections of 1,3-butadiene.

Figure 3.1.3 Neches River Outfall (WS002) – 1,3-Butadiene



These results suggest that while 1,3-butadiene was initially present at low parts per billion (ppb) levels at this location following the incident, there was no detectable long-term impact on the Neches River Basin, and thus, it is unlikely that individuals coming into contact with surface waters would be at an increased health risk.

3.1.4 Evaluation of Other Compounds of Interest

Surface water samples were also analyzed for asbestos fibers to assess the release of materials potentially containing asbestos fibers in runoff water. A summary of surface water results for asbestos is provided in Table 3.1.4.

Table 3.1.4 Asbestos Fibers in Surface Water

Location	# of Samples	# of Detections	USEPA National Primary Drinking Water Regulation (million fibers/liter)	Average Result[1] (million fibers/liter)	Detection Range[2] (million fibers/liter)
WS001	22	2	7.0	1.53	2.10 (J) – 5.40
WS002	22	0	7.0	< 1.01	< 0.53 - < 11.00

Location	# of Samples	# of Detections	USEPA National Primary Drinking Water Regulation (million fibers/liter)	Average Result[1] (million fibers/liter)	Detection Range[2] (million fibers/liter)
WS003	24	3	7.0	2.82	1.00 – 11.00
WS004	21	1	7.0	2.37	1.10
WS006	19	4	7.0	3.98	1.00 – 21.00 (J)
WS007	1	0	7.0	< 0.55	< 1.10 (J)
WS009*	5	0	7.0	< 3.17	< 1.80 - < 11.00
WS010	3	1	7.0	6.40	11
WS011*	1	0	7.0	< 2.70	< 5.40
WS014	10	1	7.0	3.28	11.00
WS015	7	1	7.0	3.64	5.30
WS016	1	1	7.0	2.70	2.70
WS021	1	0	7.0	< 0.55	< 1.10
WS022	1	0	7.0	< 5.50	< 11.00
WS023	1	0	7.0	< 0.85	< 1.70
WS024	1	0	7.0	< 8.50	< 17.00

*Baseline sample location upstream of facility
[1]If sample result is reported as a non-detection, ½ of the method detection limit (MDL) is used to calculate the average result. If sample exceeded hold time, the approximated result is included in the average.
[2]If sample result is a non-detection, the method detection limit is reported preceded by the "<" symbol.
(J) Sample exceeded hold time. Quantitation is approximate.

Whereas there are no applicable PCL or RBEL screening values for asbestos in surface water, the USEPA National Primary Drinking Water Regulation of 7.0 million fibers/liter was used as a conservative screening value. Based on these results, all average surface water sample results were below the 7.0 million fibers/liter NPDWR value. Of the 17 surface water samples collected for the permitted discharge into the Neches River (WS002), there were no detections of asbestos fibers reported.

In addition, surface water sampling results for PFOA and PFOS were compared to the USEPA drinking water advisory (70 ng/L, or 0.070 µg/L) at WS007 at the request of UC and from the Director of Public Works for the City of Port Neches, as this location is a raw water source for the city of Port Neches at the LNVA Canal. A summary of these results is provided below in Table 3.1.5.

Table 3.1.5 PFOA and PFOS Detections – WS007

Sample Location	Analyte	Baseline Range (ng/L)[1]	USEPA Drinking Water Advisory (ng/L)	Number of Results	Detection (ng/L)[2]
WS007	PFOA	< 1.5 – 1.86(J)	70	1	< 1.5
	PFOS	< 1.42 – 6.37(J)	70	1	< 3.08(BL)

[1]Baseline range is based on samples collected upstream of the facility (WS000, WS009, and WS011).
[2]If result is a non-detect, the method detection limit is reported preceded by the "<" symbol.
(J) Quantitation is approximate.
(BL) Blank contamination

Surface water sampling results of WS007 showed no detectable levels of PFOA, and PFOS levels were well below the drinking water advisory of 0.070 μg/L. As such, no exceedances of USEPA drinking water advisory levels for PFOA and PFOS were observed at this location. No further testing of this location was requested by UC or the City of Port Neches.

3.2 Drinking Water Sampling Results

To evaluate the potential downstream movement of compounds of interest, drinking water samples were collected from a faucet within the City of Port Neches Water Plant (WS008). Because 1,3-butadiene was a primary compound of interest throughout surface and drinking water efforts but is not included in the drinking water analytical method (USEPA 524.2), these samples were also analyzed by EPA Method 8260. A summary of the drinking water sampling detections is provided in Table 3.2.1.

Table 3.2.1 Drinking Water Sampling Detection Summary

Location	Analytical Method	Analyte	#of Samples	# of Detections	USEPA MCL[1] (μg/L)	TCEQ Groundwater PCL[2] (μg/L)	Average of Results[3] (μg/L)	Detection Range (μg/L)
WS008	EPA 524.2	1,2-Dichloroethane	5	1	5	5	0.5	1.8 (J)
		Acetone	5	1	NA	22,000	1.9	4.6 (J)
		Bromodichloro-methane	5	5	NA	15	3.2	2.4 – 4.9
		Chloroform	5	5	NA	240	23.8	20.8 – 31.0
		Total trihalomethanes (Calc.)[4]	5	5	80	80	27.0	23.3 – 35.8
	EPA 8260B	Acetone	6	2	NA	22,000	1.09	2.47 (J) – 2.55(J)
		Bromodichloro-methane	6	6	NA	15	3.09	2.68 – 3.47 (J)
		Chloroform	6	6	NA	240	22.3	20.3 – 25.9

Location	Analytical Method	Analyte	#of Samples	# of Detections	USEPA MCL[1] (µg/L)	TCEQ Groundwater PCL[2] (µg/L)	Average of Results[3] (µg/L)	Detection Range (µg/L)
		Dibromochloro-methane	6	3			0.20	0.2 (J) – 0.476 (J)
		Methylene chloride	6	1	5	5	0.41	1.73 (J)

NA = Not Applicable
[1]TCEQ Maximum Contaminant Level (MCL)
[2]TCEQ Groundwater PCLs are based off of USEPA Primary MCLs, when available.
[3]Average is approximate. Includes results below reporting limit (RL), and ½ of the MDL where the analyte was not detected.
[4]The total MCL for trihalomethanes (bromodichloromethane, bromoform, chloroform, and dibromochloromethane) is 80 µg/L.
(J) Quantitation is approximate.

Results from drinking water sampling efforts indicate there were no exceedances of the available TCEQ Groundwater PCLs or the USEPA MCLs. It should be noted that no drinking water advisories were issued by UC or the City of Port Neches throughout this response. Furthermore, there were no detections of 1,3-butadiene reported in any of the water samples collected from the City of Port Neches Water Plant, suggesting no downstream impact on potential drinking water sources.

4.0 CONCLUSION

In support of UC's response to the incident, CTEH followed UC-approved sampling plans to collect surface and drinking water samples to assess the potential for offsite chemical impacts and guide onsite remedial operations. Results from surface waters were compared to various health-based screening values, depending on the reported water use and community access (i.e. recreational, fishing, swimming, etc.). Similarly, drinking water samples were compared to TCEQ residential groundwater PCLs and USEPA MCLs.

Analytical sampling results indicated there were no exceedances of TCEQ Contact Recreation PCLs. Whereas some RBEL exceedances were reported for PAHs in select sampling locations, it should be noted that most of these detections above RBELs were well within range of site-specific baseline samples collected at locations upstream of the site. Importantly, PAHs are naturally occurring, and frequently documented to be present in surface waters of the United States at levels hundreds of times (up to 0.6 µg/L) above those levels documented here[25]. Although there are no applicable PCL or RBEL screening values for asbestos in surface water, it is notable that the vast majority of samples showed that asbestos fibers were either not detected or detected below drinking water regulations. The two detections of asbestos fibers above the drinking water regulation are not of toxicological significance, given that the sample locations are not categorized as a drinking water source and thus would not be used as potable water. Whereas 1,3-butadiene and related compounds were initially detected at low parts per billion

[25] ATSDR Toxicological Profile for Polycyclic Aromatic Hydrocarbons – August 1995 (https://www.atsdr.cdc.gov/toxprofiles/tp69.pdf)

levels in surface water samples collected downstream of the TPC facility, the concentrations of all detected compounds decreased rapidly to levels comparable to baseline and/or below detection limits.

All drinking water samples collected reported no exceedances of the available TCEQ drinking water PCLs or USEPA primary MCLs, and there were no detections of 1,3-butadiene in any of the collected drinking water samples. At the recommendation and approval of UC, CTEH completed surface water and drinking water sampling on January 31, 2020.

Appendix A

Environmental Sampling and Analysis Plans

THE SCIENCE OF READY™

South 4 Group Fire
Port Neches, Texas
Environmental Sampling & Analysis Plan

Version 1.0

Prepared on behalf of:

TPC Group

Prepared By:

CTEH, LLC

5120 Northshore Drive

North Little Rock, AR 72118

501-801-8500

November 29, 2019

	Name/Organization	Signature	Date Signed
Prepared by:	Shawn Wnek, PhD, DABT		11/29/2019
Reviewed by:	Linda Easton, Proj. Mngr.	Linda Easton	11/29/2019
Approved by:	JASON SANDERS, TPC		12/1/19
Approved by:	Hope Davis TCEQ		12/1/19
Approved by:	ADAM ADAMS EPA OSC		12/01/19
Approved by:			
Approved by:			

TABLE OF CONTENTS

1.0 INTRODUCTION AND PURPOSE

This Environmental Sampling and Analysis Work Plan (ESAP) prepared by CTEH, LLC (CTEH®), on behalf of TPC Group LLC (TPC) was developed, and will be implemented, to provide technical guidance for sampling activities in support of initial assessment activities at the TPC Port Neches Facility located at 2102 Spur 136, Port Neches, TX 77651 (the "Site"– see Figure 1-Appendix A). This ESAP describes the methods and procedures that will be followed during collection of environmental samples to assess pre-impact conditions and evaluate impacts as a result of the November 27, 2019 fire and associated response activities.

The specific objectives of the investigations and proposed sampling are discussed further in the site-specific sections presented herein; however, the main objectives in general are:

1). The collection of water and soil samples to coarsely delineate extent and nature of potential impact related to the fire and associated response activities; and,

2). The collection of background samples to determine a baseline and develop the range of potential background concentrations for comparative purposes. Note 'background samples' may additionally refer to samples collected from pre-impact locations associated with frac tank, waste and/or other equipment staging areas.

2.0 HEALTH AND SAFETY

Safety is the most important consideration when implementing this plan. All site personnel will review and adhere to TPC's Site Safety and Control Plan and company/contractor-specific Health and Safety Plans (HASP), as applicable. Daily tailgate safety briefings will be conducted prior to going into the field. Additional safety briefings may be given prior to undertaking particular activities such as sampling near water, handling sample containers containing acids, etc. In general, sampling will only be conducted during daylight hours (if possible) by qualified, 3rd party personnel and under weather or other environmental conditions that do not create unsafe working conditions. The appropriate personal protective equipment (PPE) will be utilized for each task. Any health and safety-related incident will be promptly reported to TPC site personnel.

3.0 DATA QUALITY OBJECTIVES

The data collected during field activities will be used to assess potential exposures of members of the public and ecological receptors to constituents potentially related to the fire and subsequent response activities. Because changes in environmental conditions are likely during the response, this will be done by reporting on chemical constituents found in the environment at the time and location of sample collection. Sampling results will be compared to applicable screening criteria and/or ambient background concentrations.

A strategic planning approach based on scientific method will be employed for data collection activities providing a systematic procedure to ensure the type, quantity and quality of data used in decision-making will be appropriate for the intended application.

Sampling procedures that will be used are based primarily on approved protocols developed by EPA, including those presented in A Compendium of Superfund Field Operations Methods (EPA, 1987). Sections 4.2 and 5.2 summarize the sampling methods to be utilized in each media.

4.0 SOIL/DITCH SEDIMENT ASSESSMENT AND SAMPLING

4.1. SOIL ASSESSMENT

To assess the Site, Areas of Interest will be identified which may include the following:

- Area of Interest 1 (AOI-01) Storm water outfalls – Based on the combination of releases occurring concurrently with the fire and subsequent response activities, there is a potential for constituents of potential concern (COPCs) to have been transported through the facility storm water management ditches to its permitted outfall.

- Area of Interest 2 (AOI-02) Storm water ditch – Based on the combination of releases occurring concurrently with the fire and subsequent response activities, as well as significant rainfall at the Site, there is a potential for constituents of potential concern (COPCs) to have migrated off-site via roadside storm water ditches.

- Background soil sample locations may be collected to evaluate naturally occurring constituent concentrations for evaluation of sampling results.

4.2. SOIL/DITCH SEDIMENT SAMPLING

Soil/ditch sediment samples collected from the potential AOIs listed above will be analyzed for applicable COPCs identified in Table 1 (Appendix B).

Soil samples will be collected using hand auger, trowel, or shovel. Each sample will be transferred to an appropriate laboratory supplied container, properly labeled, and placed in a cooler and maintained at a temperature of approximately 4°C, if preservation by temperature control is required. Head space in each sample container will be minimized to prevent loss of COCs due to volatilization.

5.0 SURFACE WATER EVALUATION AND SAMPLING METHODOLOGY

5.1. SURFACE WATER MONITORING

In order to determine that water quality is maintained for the duration of response and post response/remediation activities, monitoring at various surface water sampling location may be conducted using a YSI multi-parameter water quality meter, or equivalent. Surface water monitoring may be conducted daily or on an as needed basis (e.g., concurrent with sample collection) and may include the following parameters:

- Temperature (°C)
- pH (0-14 standard units)
- Conductivity (Siemens/meter)
- Dissolved Oxygen (milligrams/liter)
- Turbidity (NTU)

Visual observations will be made at each surface water sampling locations and electronically noted using a hand-held data collection device or recorded in a log dedicated to this project.

The water quality meters in use on this project will be calibrated in accordance with the manufacturer's specifications.

5.2. SURFACE WATER SAMPLING

Surface water samples will be decanted directly into laboratory supplied sample containers and submitted to Pace Analytical Services (Pace Labs), Earth Analytical, Inc., and/or EMSL Analytical Inc. (NELAP accredited laboratories) for laboratory analysis as presented in Table 2. Water quality parameters, including: temperature, pH, conductivity, dissolved oxygen, and turbidity may be recorded for each surface water sample. Surface water sampling may involve collection of water at various depths.

5.3. LOCATION, FREQUENCY, AND DURATION

Surface water samples may be collected from upgradient locations from the site to establish background concentrations and impounded drainage features near the Site.

Additional sampling locations may be added as appendices based on a review of the preliminary results and/or a change in operational areas and activities.

Surface water samples will be collected one time initially at each location. Subsequent samples may be collected, as required for statistics representativeness.

6.0 SAMPLE HANDLING PROCEDURES

Samples will be placed in laboratory supplied sample containers, appropriate for the intended analysis, labeled with sample identification number, sample depth (for soil/ditch sediment sampling), sampler name, sample date, analysis and methodology requested, and time of sample collection, and immediately placed in a cooler on ice pending laboratory analysis. Samples will be packaged, labeled, retained on ice, and documented in an area which is free of impact and provides for secure storage. Custody seals will be placed on each sample containing cooler, and chain-of-custody procedures will be maintained from the time of sample collection until arrival at the laboratory to protect sample integrity. Shipping or transporting of samples to the laboratory will be done within a timeframe such that recommended holding times are met. Hold times are summarized on Tables 1 thru 2 (Appendix B).

7.0 SAMPLE LABELING

Sample containers will be clearly labeled with the following information:

- Unique sample identification;
- Sample Type (discrete or composite; soil/ditch sediment samples only)
- Sample Depth (soil/ditch sediment samples and/or surface water samples);
- Sampler name or initials;
- Date sample collected;
- Time sample collected; and
- Analysis to be performed.

8.0 LABORATORY ANALYSES

Samples will be transported to Pace Labs, Earth Analytical Inc., and/or EMSL Analytical Inc. meeting National Environmental Laboratory Accreditation Conference (NELAC) certifications. Samples will be submitted for laboratory analyses for the following:

- Volatile organic compounds (VOCs), including tentatively identified compounds (TICs), in soils, sediments, or waters by EPA Method 8260B (SW-846) gas chromatography/mass spectrometry (GC/MS);
- Semi-volatile organic compounds (SVOCs) in soils, sediments, and waters by EPA Method 8270 SIM (SW-846) GC/MS modified for simultaneous ion monitoring (SIM);
- Ethylene glycol in soils, sediments, and waters by EPA Method 8015;
- Total petroleum hydrocarbon (TPH) - Texas- in soils, sediments, and waters by TX-1005;
- Perfluoroalkyl substances (PFAS) in soils, sediments, and waters by EPA 537M
- Total Organic Carbon (TOC) in soils, sediments, and waters via method SM 5310C; and
- Oil and Grease in soils and sediments via Method 9071 and in water by Method 1664
- Asbestos in soils by EPA 600 R93 116 and in water by EPA 100.2

Analytical methods, hold times, sample containers, and preservation, are summarized in Tables 1 thru 2.

9.0 QUALITY ASSURANCE

Sampling will be carried in a manner that is compliant with state regulatory QAPP requirements and respective methods to ensure that samples are collected without the effects of accidental cross- or systematic contamination. To provide QA for the proposed sampling event, the following sampling, analysis, and data validation procedures will be performed:

9.1. Field Calibration

Electronic instruments used in the field as part of this sampling event are anticipated to consist of PIDs, GPS units, digital cameras, and handheld data collection devices such as tablets/smart phones. PIDs will be calibrated daily. Non-electric equipment is not anticipated to require field calibration. Technicians utilizing each piece of equipment are responsible for maintaining (including proper battery charge) and operating this equipment such that it conforms to each respective manufacturer's specifications.

9.2. Field Duplicate Sample

For approximately every ten samples collected in the field, one field duplicate will be collected and submitted for laboratory analyses to verify the reproducibility of the sampling methods. Field duplicates will be prepared by separately submitting an aliquot from the same sample location to the laboratory for analysis consistent with the proscribed analyses. The submitted duplicate will be submitted such that the laboratory is not aware that it is a duplicate (i.e., the sample ID will not identify it as a "duplicate" for any specific sample location). At least one field duplicate will be collected each day that samples are collected.

9.3. Field Co-Located Samples

Field co-located refer to samples collected by the regulatory agency or its designee from the same sampling location and independently submitted to a different laboratory for analysis. Co-located samples may be collected at the discretion of representatives of state and federal regulatory agencies.

9.4. Laboratory QA

Laboratory quality control procedures will be conducted in a manner consistent with state regulatory requirements and respective analytical methods. Deliverables will contain the supporting documentation necessary for data validation. Internal laboratory quality control checks will include method blanks, matrix spikes (and matrix spike duplicates), surrogate samples, calibration standards, and laboratory control standards (LCSs).

9.5. Matrix Spike/Matrix Spike Duplicate Sample

Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples refer to field samples spiked with the analytes of interest prior to being analyzed at the laboratory to gauge the quality of analysis. Approximately one in twenty samples will be analyzed as MS/MSD samples.

9.6. Data Validation

Validation of the data generated by the laboratory performing the analyses will include at a minimum sample holding times, accuracy, precision, contamination of field generated or laboratory method blanks, and surrogate compound recovery. Accuracy will be determined by evaluating LCS and MS recovery. Precision will be determined by evaluating laboratory and field duplicate samples, where two sub-samples are taken from a single, homogenous sample from the same container, and are taken through the same preparative and analytical procedures to evaluate analytical precision. Level II data validation will be performed on 100% of submitted samples. Level IV data validation may be performed on up to 10% of submitted samples. All supporting data will be included in the data report package.

10.0 SAMPLE EQUIPMENT DECONTAMINATION PROCEDURES

Decontamination procedures refer to the steps undertaken to minimize the potential for offsite contamination and cross-contamination between individual sampling locations. Prior to collecting any sample for this release the following decontamination procedures will be undertaken: non-disposable sampling equipment which may come into contact with sampling media will be decontaminated using a bristled brush and a solution comprised of a laboratory grade, non-phosphate detergent (e.g., Alconox or Liquinox) and deionized water. Depending on ancillary activities being conducted for the response to this release, the decontamination of sampling equipment will be conducted over poly sheeting at the sample location or in a nearby designated area. The sampling equipment to be decontaminated will first be placed in a bucket containing the detergent solution and thoroughly washed using a bristled brush. The items will then be transferred to the second 5-gallon bucket containing deionized water for rinsing. Following the initial rinsing, the item will be held over the third 5-gallon bucket while deionized water is carefully decanted over each item. Decontaminated items will be wrapped in clean aluminum foil for transit to the next sampling location.

Nitrile gloves will be worn by sampling personnel and changed between activities at each discrete sample collection location. Previously worn nitrile gloves will be discarded in appropriate waste receptacles with other PPE.

11.0 WASTE DISPOSAL

The method for storage and disposal of investigative derived waste materials will comply with applicable local, state and federal regulations.

12.0 DATA ANALYSIS

To assess the potential impact from contact with light end hydrocarbons (i.e., 1,3-butadiene, raffinate) the results of sampling will be reviewed for the presence/absence of these compounds, and should they be found, the concentrations of these parameters relative to the COPCs results will be evaluated against TCEQ's Texas Risk Reduction Program (TRRP) Critical Protective Concentration Levels (cPCLs) or other applicable regulatory screening criteria.

13.0 DATA MANAGEMENT

The data collected will be shared appropriate TPC group.

14.0 RECORDS MANAGEMENT

Records management refers to the procedures for generating, controlling, and archiving project-specific records and records of field activities. Project records, particularly those that are anticipated to be used as evidentiary data, directly support current or ongoing technical studies and activities, and provide historical evidence needed for later reviews and analyses, will be legible, identifiable, retrievable and protected against damage, deterioration, or loss on a centralized electronic database. Handwritten records will be written in indelible ink. Records will likely include, but are not limited to, the following: bound field notebooks on pre-numbered pages, sample collection forms, personnel qualification and training forms, sample location maps, equipment maintenance and calibration forms, chain-of custody forms, maps and drawings, transportation and disposal documents, reports issued as a result of the work, procedures used, correspondences, and any deviations from the procedural records. Documentation errors will be corrected by drawing a single line through the error so it remains legible and will be initialed by the responsible individual, along with the date of change, and the correction will be written adjacent to the error.

Records will be maintained in accordance with the document retention policy established for this incident.

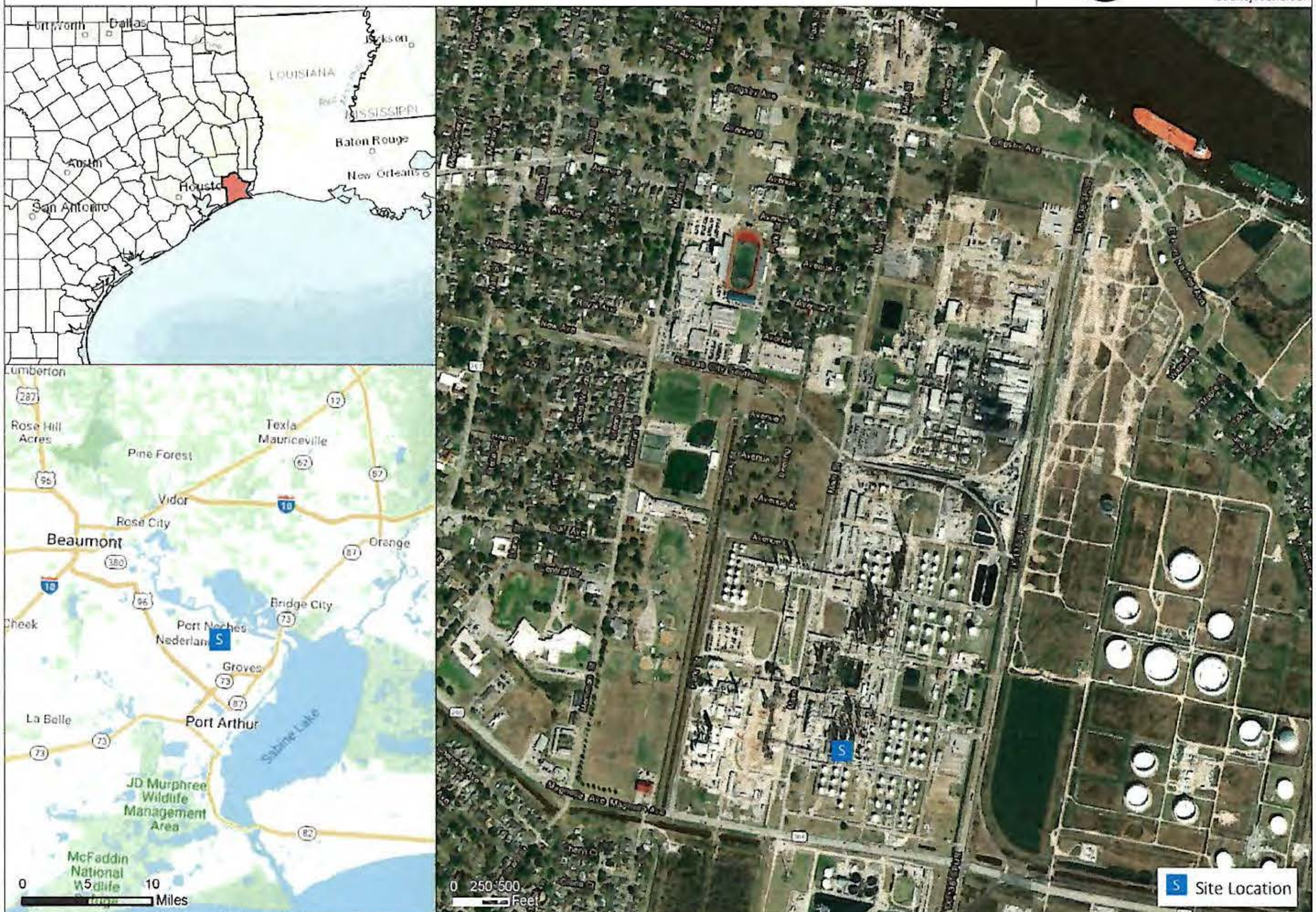
Appendix A
FIGURES

CTEH

Site Location - Figure 1

Port Neches TPC Plant Fire

Project: 112312
Client: TPC Group
City: Port Neches, TX
County: Jefferson



Projection System: Transverse Mercator Datum: NAD 1983 2011 Document Name: 112312_site_location Last Updated: 11/28/2019 6:58:11 AM

Appendix B

TABLES

TABLE 1 –SOIL/DITCH SEDIMENT SAMPLING SUMMARY

ANALYSIS	METHOD	SAMPLE CONTAINER	PRESERVATIVE	HOLD TIME
Volatile Organic Compounds (VOCs) + TICs	EPA SWA-846 8260b	Terracore	Methanol; Ice, maintained at 0-6°C	14 days preserved; 7 days unpreserved
Semi-volatile Organic Compounds (SVOCs)	EPA SWA-846 8270c (SCAN + SIM) 17 PAH	8-oz wide mouth soil jar*	Ice, maintained at 0-6°C	14 days from collection to extraction; 40 days from extraction to analysis
Ethylene Glycol	US EPA Methods 8015	8-oz wide mouth soil jar (shared jar with PAHs)	Ice, maintained at 0-6°C	14 days
TX-TPH	TX-1005	4 oz. Soil Jar	Ice, maintained at 0-6°C	Extracted within 48 hours
PFAS (PFOS and PFOA Only)	EPA 537M	(1) 125 mL HDPE	Unpreserved, Ice, maintained at 0-6°C	28 days
TOC	SM 5310C	(1) 4 oz glass jar	Unpreserved, Ice, maintained at 0-6°C	28 days
Oil and Grease	Method 9071	(1) 4 oz soil jar	Unpreserved, Ice, maintained at 0-6°C	28 days
Asbestos	EPA 600 R93 116	8 oz	No preservative	--

TABLE 2 – SURFACE WATER SAMPLING SUMMARY

ANALYSIS	METHOD	SAMPLE CONTAINER	PRESERVATIVE	HOLD TIME
Volatile Organic Compounds (VOCs) + TICs	EPA SWA-846 8260b	2 x 40 mL VOA vials	HCL to pH < 2; Ice, maintained at 0-6°C	14 days preserved; 7 days unpreserved
Semi-volatile Organic Compounds (SVOCs)	EPA SWA-846 8270c (SCAN + SIM) 17 PAH	3 x 1 L Amber Glass	Ice, maintained at 0-6°C	7 Days from collection to extraction; 40 days from extraction to analysis
Ethylene Glycol	US EPA Methods 8015	2 x 40 mL VOA vials	Ice, maintained at 0-6°C	14 days
TX-TPH	TX-1005	2 x 40 mL VOA vials	HCL to pH < 2; Ice, maintained at 0-6°C	14 days preserved; 7 days unpreserved
PFAS (PFOS and PFOA Only)	EPA 537M	(2) 125mL HDPE	unpreserved	28 days
TOC	SM 5310C	(2) 40 mL VOAs	HCL to pH < 2; Ice, maintained at 0-6°C	28 days
Oil and Grease	Method 1664	(1) L Glass Jar	HCL to pH < 2; Ice, maintained at 0-6°C	28 days
Asbestos	EPA 100.2	1L Poly or Glass Container	Ozone Treated	48 Hours if not ozone treated; no hold time if ozone treated.

*** Report all soil analysis as dry weight**

CTEH THE SCIENCE OF READY

South 4 Group Fire

Port Neches, TX

Environmental Sampling Reduction Plan

Prepared on Behalf of:

TPC Group

Prepared By:

CTEH, LLC

5120 Northshore Drive

Little Rock, AR 72118

501-801-8500

December 9, 2019

	Name/Organization	Signature	Date Signed
Prepared by:	Dana Szymkowicz, PhD; CTEH	Dana Szymkowicz	12/9/2019
Reviewed by:	Shawn Wnek, PhD, DABT; CTEH		12/9/2019
Reviewed by:	Pablo Sanchez Soria, PhD, CIH; CTEH		12/10/2019
Approved by:	Michael C. Miller, Env. Unit Lead		12/10/2019
Approved by:	ADAM ADAMS EPA OSC		12/11/19
Approved by:	[illegible] SOSC		12/11/19
Approved by:	Robert Grimm DEMC		12/11/19
Approved by:			

Introduction

In response to the South 4 Group Fire and at the request of TPC Group with Unified Command, CTEH® has been asked to collect surface water samples at locations throughout the TPC Group and Joint Waste Water Treatment Plant (JWWTP) facilities in Port Neches, TX. These sampling event requests have been driven by concerns over the potential presence of volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), per- and polyfluoroalkyl substances (PFAS), and asbestos in waste water effluents and outfalls both on- and off-site. These surface water samples will be used to delineate and evaluate the extent of potential impact and contamination across the various on-site and downstream water bodies.

CTEH® has been collecting surface water samples daily since November 28, 2019. As of December 9, 2019, 17 surface water sampling stations have been established, five of which are sampled twice a day and four of which are sampled once daily. The remaining eight locations have been selected for discrete sampling events and are not continuously being sampled (i.e., sampled upon request from Unified Command). As of December 7, 2019, approximately 133 surface water samples have been collected and submitted for laboratory analysis, and results from approximately 96 surface water samples have been received.

In accordance with the Environmental Sampling and Analysis Plan (ESAP), surface water samples have been collected in laboratory-supplied sample containers and submitted to Pace Analytical Services (Pace Labs) and/or EMSL Analytical Inc. (NELAP accredited laboratories) for analysis of various constituents of concern. Surface water samples were analyzed for various constituents as described in the ESAP and compared to TCEQ Contact Recreation Water Protective Concentration Levels (PCLs) and the USEPA Water Quality recommendation for asbestos in drinking water. To date, no exceedances of applicable TCEQ Contact Recreation PCLs or asbestos screening levels have been documented at off-site locations.

Surface Water Sampling Reductions

Given the number of samples collected to date that have shown no exceedances of applicable TCEQ health-protective screening levels, CTEH® proposes to continue collecting surface water samples daily throughout the response and during cleanup activities, while recommending a reduction in redundant sampling locations downstream of the JWWTP, as well as a reduction in sampling frequency to once per day, at most. A map of the proposed sampling locations is provided in **Attachment A.** Five locations will continue to be sampled once daily based on their location in proximity to the TPC facility, waste water outfalls, and off-site locations (WS002, WS003, WS006, WS010, WS017). Five additional locations will be sampled by request only, when/if the occurrence of rain events results in drainage changes downstream of the JWWTP (WS001, WS004, WS005, WS015, W016).

In addition to reducing sampling locations and frequencies, CTEH will discontinue asbestos analysis for surface water samples. As of December 7, 2019, all of the surface water samples collected and analyzed outside of the TPC facility showed no detectable asbestos fibers above the drinking water maximum contaminant level (MCL) established by USEPA. Furthermore, according to the USEPA Framework for Investigating Asbestos-Contaminated Superfund Sites[1], "*...ingestion of asbestos via drinking water has not historically been considered an important exposure route when compared to*

[1] USEPA, 2008: https://semspub.epa.gov/work/HQ/175329.pdf

the fire, ingestion of asbestos fibers is not anticipated to present a health risk, particularly as the surface water sampled is not intended for human consumption.

Surface water sampling will continue as proposed in this environmental sampling reduction plan, until Unified Command deems appropriate, based on additional sample results and on-site operations.

Management of Change

Change from version 1.0 to 1.1

- *In the section titled:*

	Name/Organization	Signature	Date Signed
Prepared by			
Reviewed by			
Approved by			
Approved by			
Approved by			
Approved by			

Attachment A

CTEH

Water Sampling Locations (Environmental Sampling Reduction Plan)

South 4 Group Fire I Port Neches, TX

Project: 112312
Client: TPC Group
City: Port Neches, TX
County: Jefferson

Projection System: Transverse Mercator Datum: NAD 1983 2011 StatePlane Mississippi East FIPS 2301 Ft US Last Updated: 12/10/2019 7:48:10 AM

*GPS Coordinates are Approximate

Appendix B

Drinking Water Sampling Plan

CTEH
THE SCIENCE OF READY℠

CTEH THE SCIENCE OF READY™

South 4 Group Fire

Port Neches, TX

Drinking Water Sampling Plan

Prepared on Behalf of:

TPC Group

Prepared By:

CTEH, LLC

5120 Northshore Drive

Little Rock, AR 72118

501-801-8500

January 15, 2020

	Name/Organization	Signature	Date Signed
Prepared by:	Dana Szymkowicz, PhD; CTEH	Dana Szymkowicz	1/15/2020
Reviewed by:	Shawn Wnek, PhD, DABT; CTEH	[signature]	1/15/2020
Reviewed by:	JASON SANDERS, TPC	J Sanders	2/20/2020
Approved by:			
Approved by:			
Approved by:			
Approved by:			
Approved by:			

Introduction

In response to the South 4 Group Fire and at the request of TPC Group with Unified Command, CTEH® has been asked to collect drinking water samples in addition to surface water samples at locations throughout the TPC Group and Joint Waste Water Treatment Plant (JWWTP) facilities in Port Neches, TX. These sampling event requests have been driven by the concerns over the potential presence of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) in potential drinking water sources in locations downstream of the JWWTP.

This Drinking Water Sampling Plan has been developed out of an abundance of caution to evaluate the extent of potential impact, if any, on drinking water sources on-site.

Drinking Water Sampling

Drinking water samples will be decanted directly into laboratory supplied sample containers and submitted to Pace Analytical Services Gulf Coast (Pace Labs), a National Environmental Laboratory Accreditation Conference (NELAC)-certified laboratory, for laboratory analysis of VOCs and SVOCs, as presented in Table 1. Field blanks will be collected for every sampling event, and field duplicates may be collected for approximately every five samples. A representative number of samples may be collected from various location(s) on-site downstream of the JWWTP. Sampling frequency and number of locations may be increased, decreased, or discontinued based on a review of the results or with changes in conditions onsite.

Table 1. Drinking Water Analysis Methods

ANALYSIS	METHOD	SAMPLE CONTAINER	PRESERVATIVE	HOLD TIME
Volatile Organic Compounds (VOCs) + TICs	EPA 524.2 + TICs	2 x 40 mL VOA vials	Sample dechlorination (ascorbic acid)	14 days preserved; 7 days unpreserved
Semi-volatile Organic Compounds (SVOCs)	EPA 525.2	3 x 1 L Amber Glass	Sample dechlorination (sodium sulfite)	14 days preserved; 7 days unpreserved

Drinking water sample results may be reviewed for the presence or absence of these compounds. Results may also be compared to the available Texas Commission on Environmental Quality (TCEQ) Maximum Contaminant Level (MCL) screening values for drinking water.

Sample Handling Procedures

Samples will be placed in laboratory supplied sample containers, appropriate for the intended analysis, labeled with the following:

- Sample identification number
- Sampler name
- Sample date
- Analysis and methodology requested
- Time of sample collection

Samples will be immediately placed in a cooler on ice pending laboratory analysis. Samples will be packaged, labeled, retained on ice, and documented in an area which is free of impact and provides for secure storage. Custody seals will be placed on each sample containing cooler, and chain-of-custody procedures will be maintained from the time of sample collection until arrival at the laboratory to protect sample integrity. Shipping or transporting of samples to the laboratory will be done within a timeframe such that recommended holding times are met. Hold times are summarized on Tables 1.

Quality Assurance Procedures

To provide QA for the proposed sampling event, sampling, analysis, and data validation procedures will be performed. Sampling will be carried out in with quality assurance (QA) in mind with appropriate blanks collected as per their respective EPA methods. The goal of the QA process is to document that samples are collected without the effects of accidental cross- or systematic contamination and refers to the sampling, analysis, and data validation procedures for generating valid and defensible data.

Laboratory quality control procedures will be conducted in a manner consistent with relevant state and federal regulatory guidance and respective analytical methods. Deliverables will contain the supporting documentation necessary for data validation. Validation of the data generated by the laboratory performing the analyses will include at a minimum sample holding times, accuracy, precision, contamination of field generated and/or laboratory method blank. Precision may be determined by evaluating laboratory and field duplicate samples. Level II data validation may be performed on up to 100% of submitted samples.

Management of Change

Change from version 1.0 to 1.1

- *In the section titled:*

	Name/Organization	Signature	Date Signed
Prepared by			
Reviewed by			
Approved by			
Approved by			
Approved by			
Approved by			

Appendix C

Incident Map and Sample Locations

Water Sampling Locations (All)

South 4 Group Fire l Port Neches, TX

Projection System: Transverse Mercator   Datum: NAD 1983 2011 StatePlane Mississippi East FIPS 2301 Ft US   Last Updated: 5/1/2020 2:06:16 PM

*GPS Coordinates are Approximate

CTEH

Surface Water Sampling Flow Paths

South 4 Group Fire I Port Neches, TX

0 0.5 1 Miles

Project: 112312
Client: TPC Group
City: Port Neches, TX
County: Jefferson

Projection System: Transverse Mercator *Datum: NAD 1983 2011 StatePlane Mississippi East FIPS 2301 Ft US* *Last Updated: 5/1/2020 1:33:28 PM*

**GPS Coordinates are Approximate*

Appendix D

Sample Identification Summary Table

Samples by Location

Location Code	Day Collected	Sample Number	Sample Type
WS000	11/27/2019	PNTX1127X001	Surface Water
WS001	11/29/2019	PNTX1129X001	Surface Water
		PNTX1129X001B	Surface Water
	11/30/2019	PNTX1130V001B	Surface Water
		PNTX1130X001A	Surface Water
		PNTX1130X001B	Surface Water
	12/1/2019	PNTX1201X001A	Surface Water
		PNTX1201X001B	Surface Water
	12/2/2019	PNTX1202X001A	Surface Water
		PNTX1202X001B	Surface Water
	12/3/2019	PNTX1203V001B	Surface Water
		PNTX1203X001A	Surface Water
		PNTX1203X001B	Surface Water
	12/4/2019	PNTX1204X001A	Surface Water
		PNTX1204X001B	Surface Water
	12/5/2019	PNTX1205X001A	Surface Water
		PNTX1205X001B	Surface Water
	12/6/2019	PNTX1206X001A	Surface Water
		PNTX1206X001B	Surface Water
	12/7/2019	PNTX1207X001A	Surface Water
		PNTX1207X001B	Surface Water
	12/8/2019	PNTX1208X001A	Surface Water
		PNTX1208X001B	Surface Water
	12/9/2019	PNTX1209X001A	Surface Water
WS002	11/29/2019	PNTX1129X002	Surface Water
		PNTX1129X002B	Surface Water
	11/30/2019	PNTX1130X002A	Surface Water
		PNTX1130X002B	Surface Water
	12/1/2019	PNTX1201X002A	Surface Water
		PNTX1201X002B	Surface Water
	12/2/2019	PNTX1202X002A	Surface Water
		PNTX1202X002B	Surface Water
	12/3/2019	PNTX1203X002A	Surface Water
		PNTX1203X002B	Surface Water
	12/4/2019	PNTX1204X002A	Surface Water
		PNTX1204X002B	Surface Water
	12/5/2019	PNTX1205X002A	Surface Water
		PNTX1205X002B	Surface Water
	12/6/2019	PNTX1206X002A	Surface Water
		PNTX1206X002B	Surface Water
	12/7/2019	PNTX1207X002A	Surface Water
		PNTX1207X002B	Surface Water
	12/8/2019	PNTX1208X002A	Surface Water
		PNTX1208X002B	Surface Water

Samples by Location

Location Code	Day Collected	Sample Number	Sample Type
WS002	12/9/2019	PNTX1209X002A	Surface Water
	12/10/2019	PNTX1210X002	Surface Water
	12/11/2019	PNTX1211X002	Surface Water
	12/12/2019	PNTX1212X002	Surface Water
	12/13/2019	PNTX1213X002	Surface Water
	12/14/2019	PNTX1214X002	Surface Water
	12/15/2019	PNTX1215X002	Surface Water
	12/16/2019	PNTX1216X002	Surface Water
	12/17/2019	PNTX1217X002	Surface Water
	12/18/2019	PNTX1218X002	Surface Water
	12/19/2019	PNTX1219X002	Surface Water
	12/26/2019	PNTX1226X002	Surface Water
	1/2/2020	PNTX0102X002	Surface Water
	1/9/2020	PNTX0109X002	Surface Water
	1/17/2020	PNTX0117X002	Surface Water
	1/23/2020	PNTX0123X002	Surface Water
	1/31/2020	PNTX0131X002	Surface Water
WS003	11/29/2019	PNTX1129X003	Surface Water
		PNTX1129X003B	Surface Water
	11/30/2019	PNTX1130X003A	Surface Water
		PNTX1130X003B	Surface Water
	12/1/2019	PNTX1201V003B	Surface Water
		PNTX1201X003A	Surface Water
		PNTX1201X003B	Surface Water
	12/2/2019	PNTX1202X003A	Surface Water
		PNTX1202X003B	Surface Water
	12/3/2019	PNTX1203X003A	Surface Water
		PNTX1203X003B	Surface Water
	12/4/2019	PNTX1204X003A	Surface Water
		PNTX1204X003B	Surface Water
	12/5/2019	PNTX1205X003A	Surface Water
		PNTX1205X003B	Surface Water
	12/6/2019	PNTX1206X003A	Surface Water
		PNTX1206X003B	Surface Water
	12/7/2019	PNTX1207V003B	Surface Water
		PNTX1207X003A	Surface Water
		PNTX1207X003B	Surface Water
	12/8/2019	PNTX1208X003A	Surface Water
		PNTX1208X003B	Surface Water
	12/9/2019	PNTX1209X003A	Surface Water
	12/10/2019	PNTX1210V003	Surface Water
		PNTX1210X003	Surface Water
	12/11/2019	PNTX1211X003	Surface Water
	12/12/2019	PNTX1212X003	Surface Water

Samples by Location

Location Code	Day Collected	Sample Number	Sample Type
WS003	12/13/2019	PNTX1213X003	Surface Water
	12/14/2019	PNTX1214X003	Surface Water
	12/15/2019	PNTX1215X003	Surface Water
	12/16/2019	PNTX1216V003	Surface Water
		PNTX1216X003	Surface Water
	12/17/2019	PNTX1217X003	Surface Water
	12/18/2019	PNTX1218X003	Surface Water
	12/19/2019	PNTX1219X003	Surface Water
	12/26/2019	PNTX1226X003	Surface Water
	1/2/2020	PNTX0102X003	Surface Water
	1/9/2020	PNTX0109V003	Surface Water
		PNTX0109X003	Surface Water
	1/17/2020	PNTX0117X003	Surface Water
	1/23/2020	PNTX0123X003	Surface Water
	1/31/2020	PNTX0131X003	Surface Water
WS004	11/29/2019	PNTX1129X004	Surface Water
		PNTX1129X004B	Surface Water
	11/30/2019	PNTX1130X004A	Surface Water
		PNTX1130X004B	Surface Water
	12/1/2019	PNTX1201X004A	Surface Water
		PNTX1201X004B	Surface Water
	12/2/2019	PNTX1202X004A	Surface Water
		PNTX1202X004B	Surface Water
	12/3/2019	PNTX1203X004A	Surface Water
		PNTX1203X004B	Surface Water
	12/4/2019	PNTX1204X004A	Surface Water
		PNTX1204X004B	Surface Water
	12/5/2019	PNTX1205V004A	Surface Water
		PNTX1205X004A	Surface Water
		PNTX1205X004B	Surface Water
	12/6/2019	PNTX1206X004A	Surface Water
		PNTX1206X004B	Surface Water
	12/7/2019	PNTX1207X004A	Surface Water
		PNTX1207X004B	Surface Water
	12/8/2019	PNTX1208X004A	Surface Water
		PNTX1208X004B	Surface Water
	12/9/2019	PNTX1209X004A	Surface Water
WS005	11/29/2019	PNTX1129X005	Surface Water
WS006	11/29/2019	PNTX1129X006A	Surface Water
	11/30/2019	PNTX1130X006A	Surface Water
		PNTX1130X006B	Surface Water
	12/1/2019	PNTX1201X006A	Surface Water
		PNTX1201X006B	Surface Water
	12/2/2019	PNTX1202X006A	Surface Water

Samples by Location

Location Code	Day Collected	Sample Number	Sample Type
WS006	12/2/2019	PNTX1202X006B	Surface Water
	12/3/2019	PNTX1203X006A	Surface Water
		PNTX1203X006B	Surface Water
	12/4/2019	PNTX1204X006A	Surface Water
		PNTX1204X006B	Surface Water
	12/5/2019	PNTX1205X006A	Surface Water
		PNTX1205X006B	Surface Water
	12/6/2019	PNTX1206X006A	Surface Water
		PNTX1206X006B	Surface Water
	12/7/2019	PNTX1207X006A	Surface Water
		PNTX1207X006B	Surface Water
	12/8/2019	PNTX1208X006A	Surface Water
		PNTX1208X006B	Surface Water
	12/9/2019	PNTX1209X006A	Surface Water
	12/10/2019	PNTX1210X006	Surface Water
	12/11/2019	PNTX1211X006	Surface Water
	12/12/2019	PNTX1212X006	Surface Water
	12/13/2019	PNTX1213X006	Surface Water
	12/14/2019	PNTX1214V006	Surface Water
		PNTX1214X006	Surface Water
	12/15/2019	PNTX1215X006	Surface Water
	12/16/2019	PNTX1216X006	Surface Water
	12/17/2019	PNTX1217X006	Surface Water
	12/18/2019	PNTX1218X006	Surface Water
	12/19/2019	PNTX1219X006	Surface Water
	12/26/2019	PNTX1226V006	Surface Water
		PNTX1226X006	Surface Water
	1/2/2020	PNTX0102X006	Surface Water
	1/9/2020	PNTX0109X006	Surface Water
	1/17/2020	PNTX0117X006	Surface Water
	1/23/2020	PNTX0123X006	Surface Water
	1/30/2020	PNTX0130X006	Surface Water
WS007	11/29/2019	PNTX1129X007	Surface Water
WS008	11/30/2019	PNTX1130X008	Surface Water
	12/17/2019	PNTX1217DW008	Drinking Water
	12/26/2019	PNTX1226DW008	Drinking Water
	1/2/2020	PNTX0102DW008	Drinking Water
	1/9/2020	PNTX0109DW008	Drinking Water
	1/17/2020	PNTX0117DV008	Drinking Water
		PNTX0117DW008	Drinking Water
		PNTX0117V008	Surface Water
		PNTX0117X008	Surface Water
	1/18/2020	PNTX0118DW008	Drinking Water
		PNTX0118X008	Surface Water

Samples by Location

Location Code	Day Collected	Sample Number	Sample Type
WS008	1/19/2020	PNTX0119DW008	Drinking Water
		PNTX0119X008	Surface Water
WS009	12/1/2019	PNTX1201Y009	Surface Water
	12/10/2019	PNTX1210Y009	Surface Water
	12/11/2019	PNTX1211Y009	Surface Water
	12/13/2019	PNTX1213Y009	Surface Water
	12/16/2019	PNTX1216Y009	Surface Water
	12/19/2019	PNTX1219Y009	Surface Water
	1/2/2020	PNTX0102Y009	Surface Water
	1/9/2020	PNTX0109Y009	Surface Water
	1/18/2020	PNTX0118Y009	Surface Water
WS010	12/1/2019	PNTX1201X010	Surface Water
	12/2/2019	PNTX1202X010	Surface Water
	12/3/2019	PNTX1203X010	Surface Water
	12/5/2019	PNTX1205X010	Surface Water
	12/6/2019	PNTX1206X010	Surface Water
	12/9/2019	PNTX1209X010	Surface Water
	12/11/2019	PNTX1211X010	Surface Water
	12/12/2019	PNTX1212X010	Surface Water
	12/13/2019	PNTX1213X010	Surface Water
	12/14/2019	PNTX1214X010	Surface Water
	12/15/2019	PNTX1215X010	Surface Water
	12/16/2019	PNTX1216X010	Surface Water
	12/17/2019	PNTX1217X010	Surface Water
	12/19/2019	PNTX1219X010	Surface Water
	12/26/2019	PNTX1226X010	Surface Water
	1/2/2020	PNTX0102X010	Surface Water
	1/9/2020	PNTX0109X010	Surface Water
	1/17/2020	PNTX0117X010	Surface Water
	1/23/2020	PNTX0123V010	Surface Water
		PNTX0123X010	Surface Water
	1/30/2020	PNTX0130X010	Surface Water
WS011	12/2/2019	PNTX1202X011	Surface Water
WS014	12/3/2019	PNTX1203X014	Surface Water
	12/5/2019	PNTX1205X014A	Surface Water
		PNTX1205X014B	Surface Water
	12/6/2019	PNTX1206X014A	Surface Water
		PNTX1206X014B	Surface Water
	12/7/2019	PNTX1207X014A	Surface Water
		PNTX1207X014B	Surface Water
	12/8/2019	PNTX1208X014	Surface Water
	12/9/2019	PNTX1209X014	Surface Water
	12/17/2019	PNTX1217X014	Surface Water
	12/26/2019	PNTX1226X014	Surface Water

Samples by Location

Location Code	Day Collected	Sample Number	Sample Type
WS014	1/2/2020	PNTX0102X014	Surface Water
	1/9/2020	PNTX0109X014	Surface Water
	1/18/2020	PNTX0118X014	Surface Water
	1/23/2020	PNTX0123X014	Surface Water
	1/30/2020	PNTX0130X014	Surface Water
WS015	12/4/2019	PNTX1204X015	Surface Water
	12/6/2019	PNTX1206X015	Surface Water
	12/7/2019	PNTX1207X015A	Surface Water
		PNTX1207X015B	Surface Water
	12/8/2019	PNTX1208V015B	Surface Water
		PNTX1208X015A	Surface Water
		PNTX1208X015B	Surface Water
	12/9/2019	PNTX1209X015A	Surface Water
WS016	12/6/2019	PNTX1206X016	Surface Water
	12/10/2019	PNTX1210X016	Surface Water
WS017	12/5/2019	PNTX1205X017B	Surface Water
	12/6/2019	PNTX1206X017	Surface Water
	12/7/2019	PNTX1207X017	Surface Water
	12/8/2019	PNTX1208X017	Surface Water
	12/9/2019	PNTX1209X017	Surface Water
	12/10/2019	PNTX1210X017	Surface Water
	12/11/2019	PNTX1211X017	Surface Water
	12/12/2019	PNTX1212X017	Surface Water
	12/13/2019	PNTX1213X017	Surface Water
	12/14/2019	PNTX1214X017	Surface Water
	12/15/2019	PNTX1215X017	Surface Water
	12/16/2019	PNTX1216X017	Surface Water
	12/17/2019	PNTX1217X017	Surface Water
	12/18/2019	PNTX1218X017	Surface Water
	12/19/2019	PNTX1219X017	Surface Water
	12/26/2019	PNTX1226X017	Surface Water
	1/2/2020	PNTX0102X017	Surface Water
	1/9/2020	PNTX0109X017	Surface Water
	1/17/2020	PNTX0117X017	Surface Water
	1/23/2020	PNTX0123X017	Surface Water
	1/30/2020	PNTX0130X017	Surface Water
WS021	12/8/2019	PNTX1208X021	Surface Water
WS022	12/8/2019	PNTX1208X022	Surface Water
WS023	12/11/2019	PNTX1211X023	Surface Water
	12/12/2019	PNTX1212X023	Surface Water
	12/13/2019	PNTX1213X023	Surface Water
	12/14/2019	PNTX1214X023	Surface Water
	12/15/2019	PNTX1215X023	Surface Water
	12/17/2019	PNTX1217X023	Surface Water

Samples by Location

Location Code	Day Collected	Sample Number	Sample Type
WS023	12/18/2019	PNTX1218X023	Surface Water
	12/19/2019	PNTX1219X023	Surface Water
	12/26/2019	PNTX1226X023	Surface Water
	1/2/2020	PNTX0102X023	Surface Water
	1/9/2020	PNTX0109X023	Surface Water
	1/18/2020	PNTX0118X023	Surface Water
WS024	12/11/2019	PNTX1211X024	Surface Water
	12/12/2019	PNTX1212X024	Surface Water
	12/13/2019	PNTX1213X024	Surface Water
	12/14/2019	PNTX1214X024	Surface Water

Appendix E

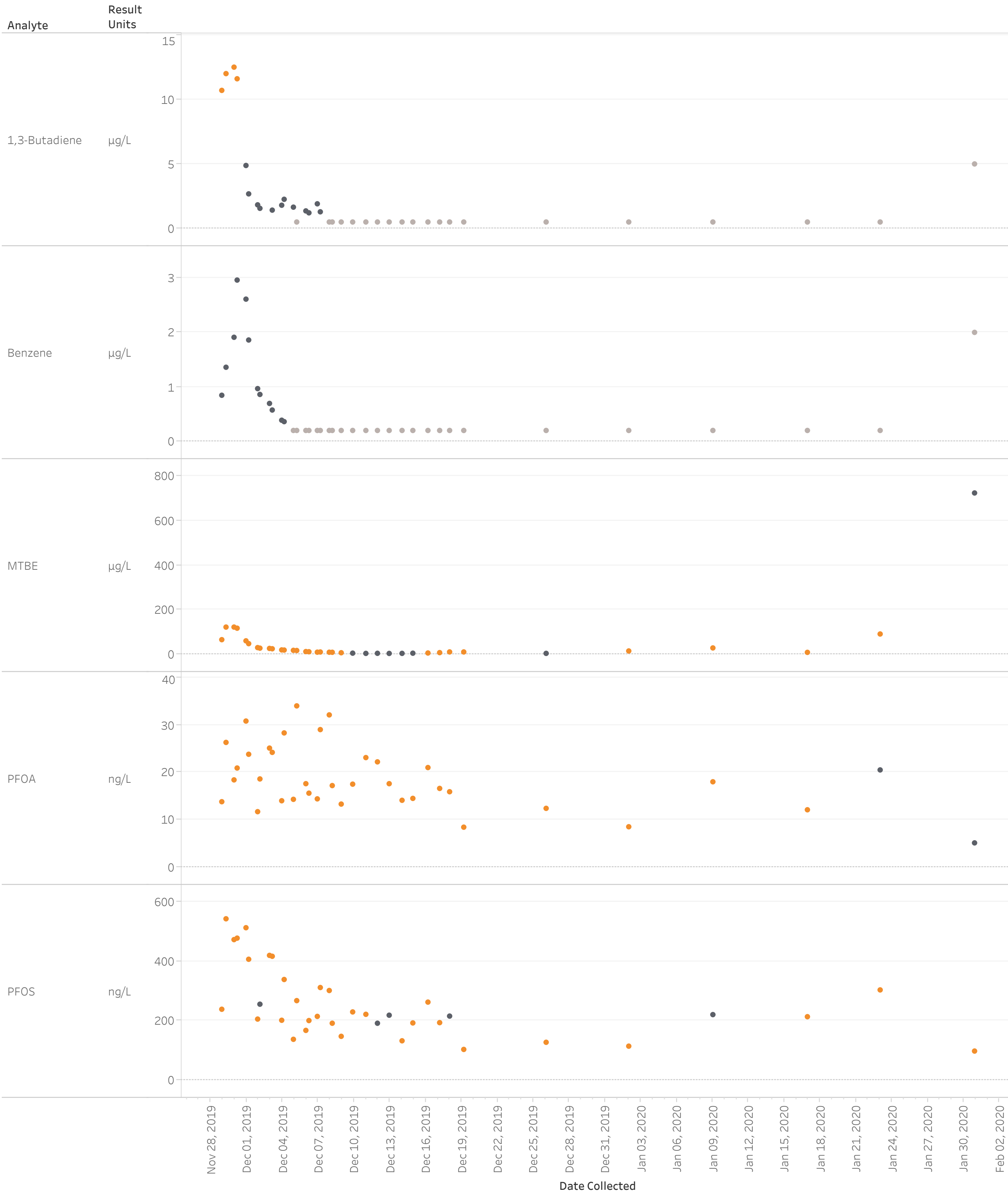
Daily Surface Water Sampling Results

Appendix G

Surface Water Trend Graphs – WS002

Analytical Water Result Trends - WS002

Neches River Basin Permitted Discharge Outfall 004

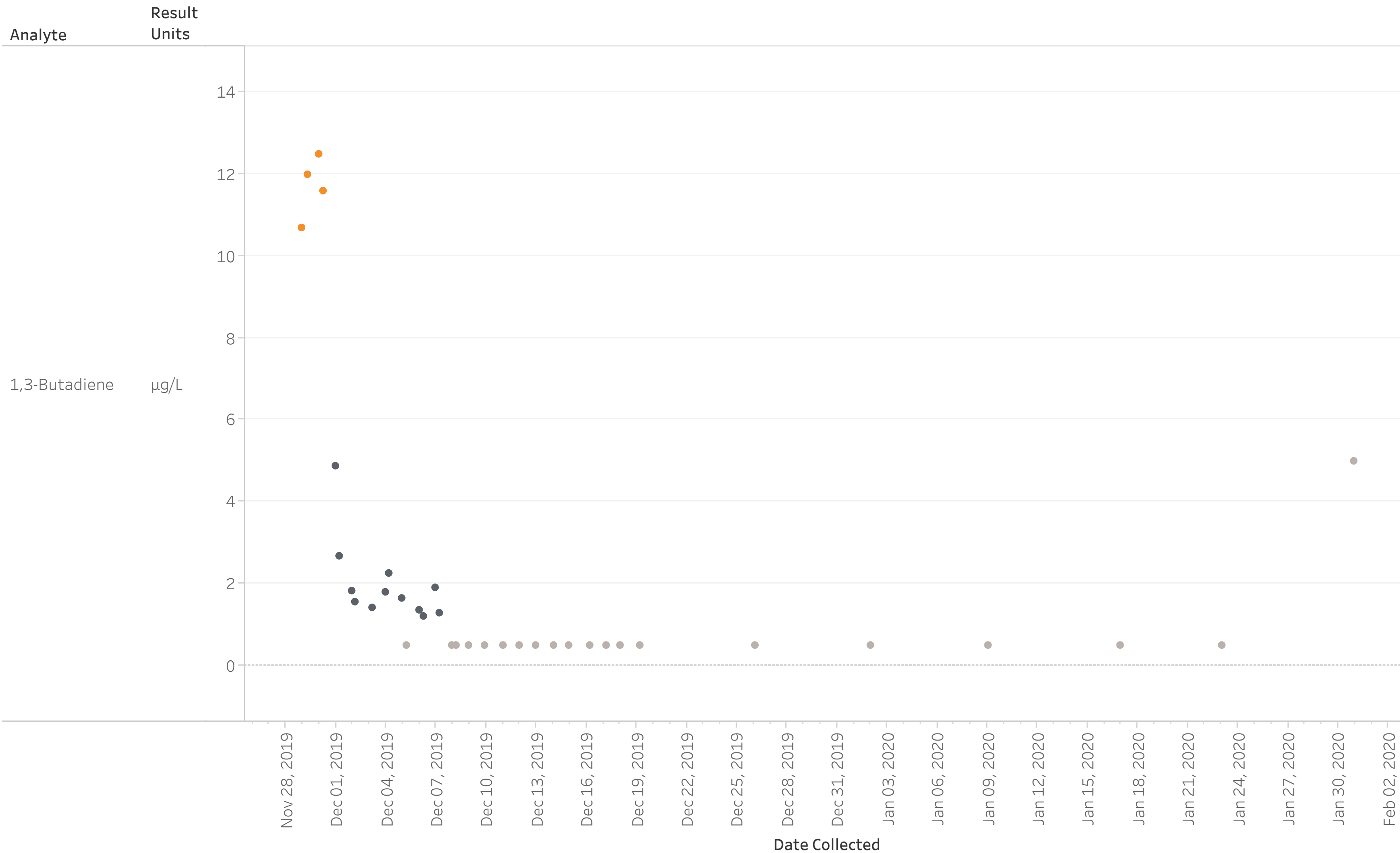


Result Qualifier Legend

- Detected
- Detected Below RL
- Not Detected

Analytical Water Result Trends - WS002

Neches River Basin Permitted Discharge Outfall 004

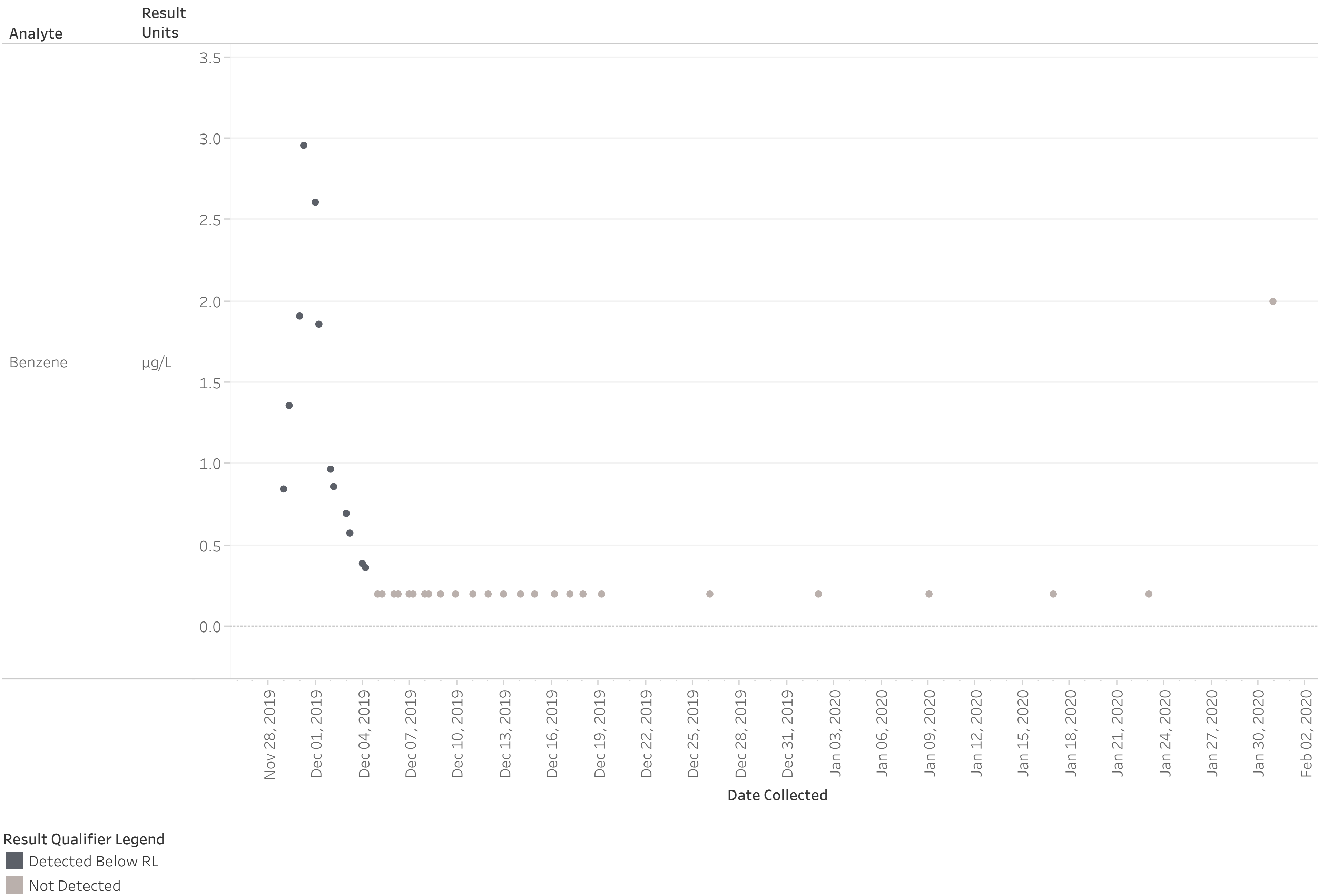


Result Qualifier Legend

- Detected
- Detected Below RL
- Not Detected

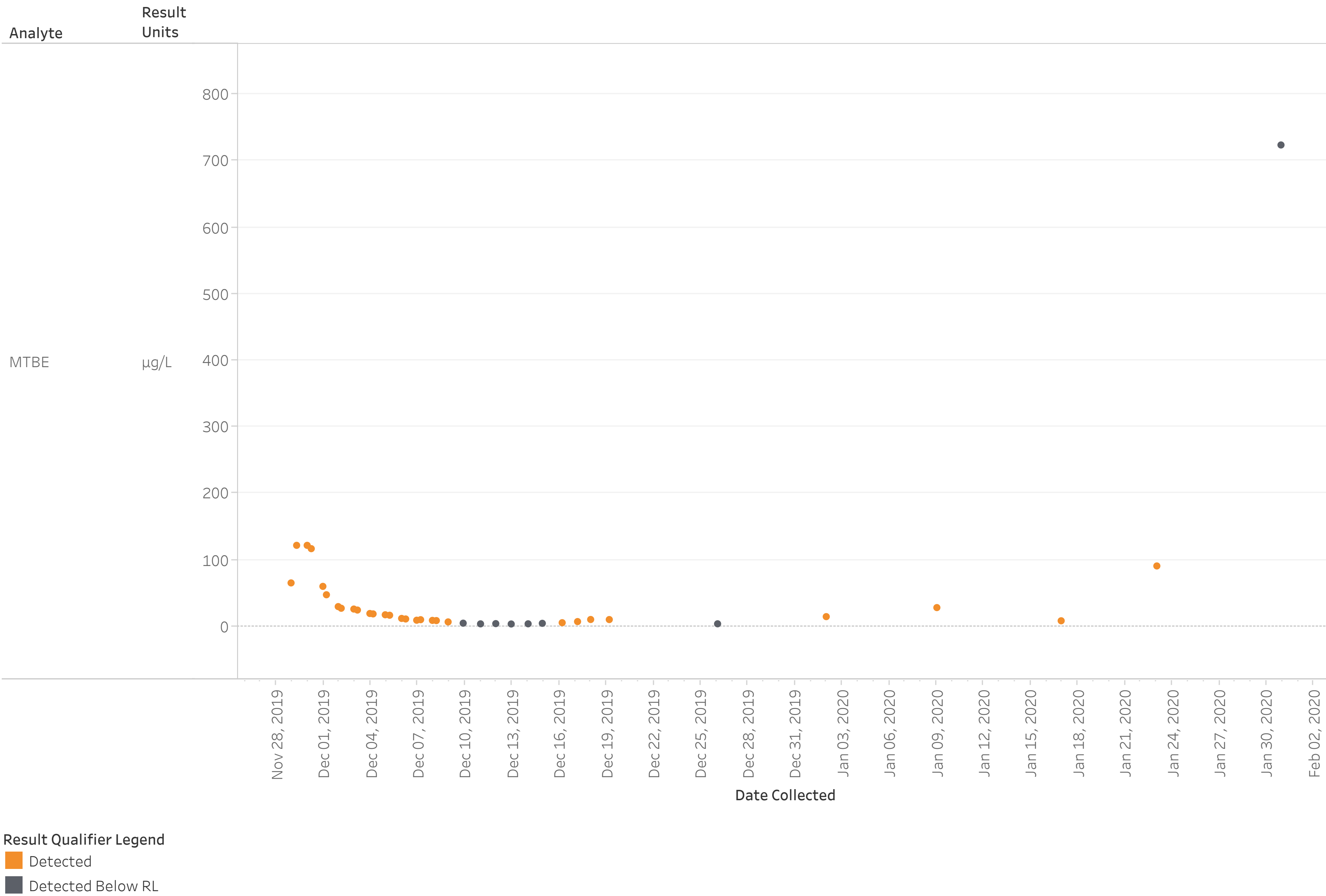
Analytical Water Result Trends - WS002

Neches River Basin Permitted Discharge Outfall 004



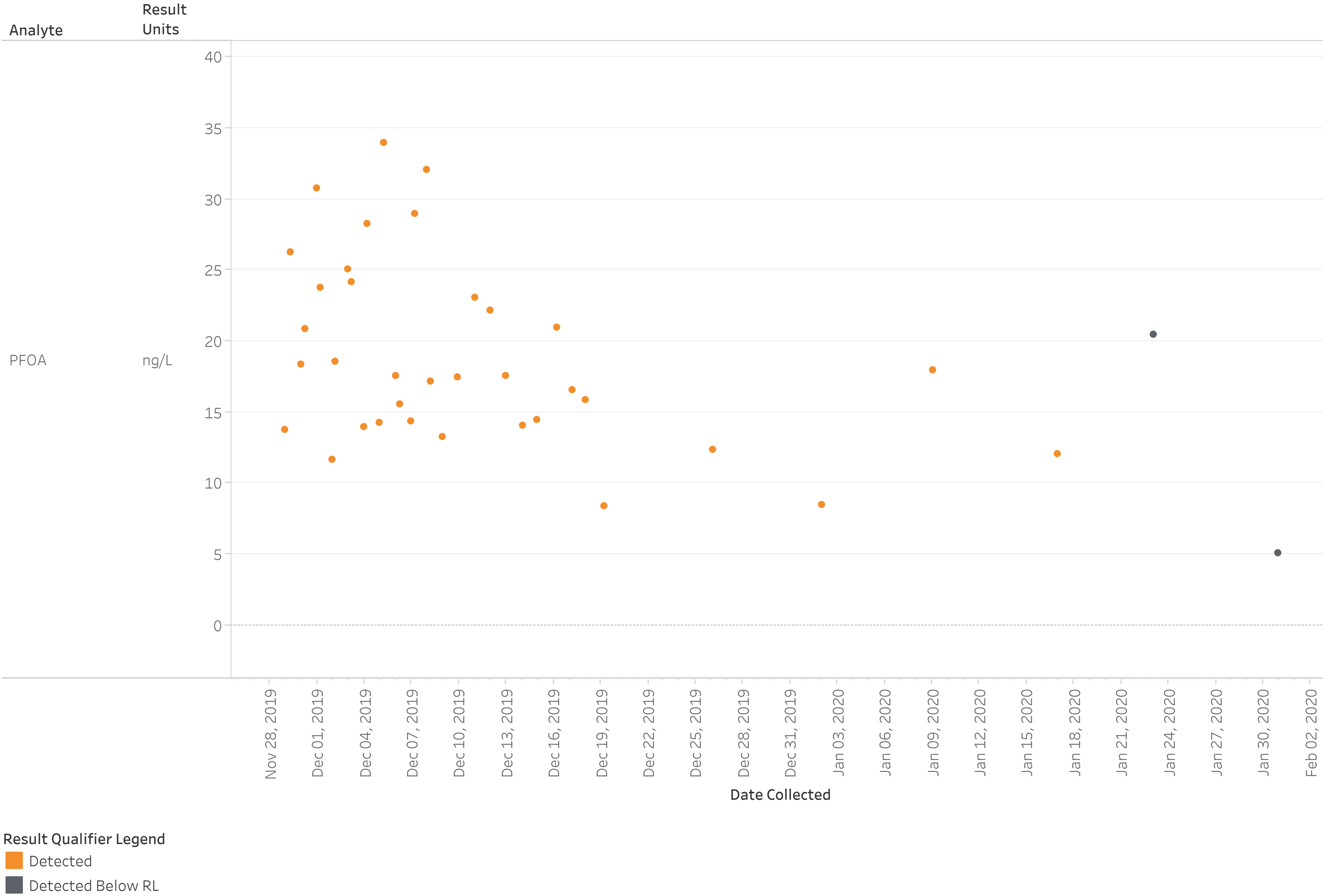
Analytical Water Result Trends - WS002

Neches River Basin Permitted Discharge Outfall 004



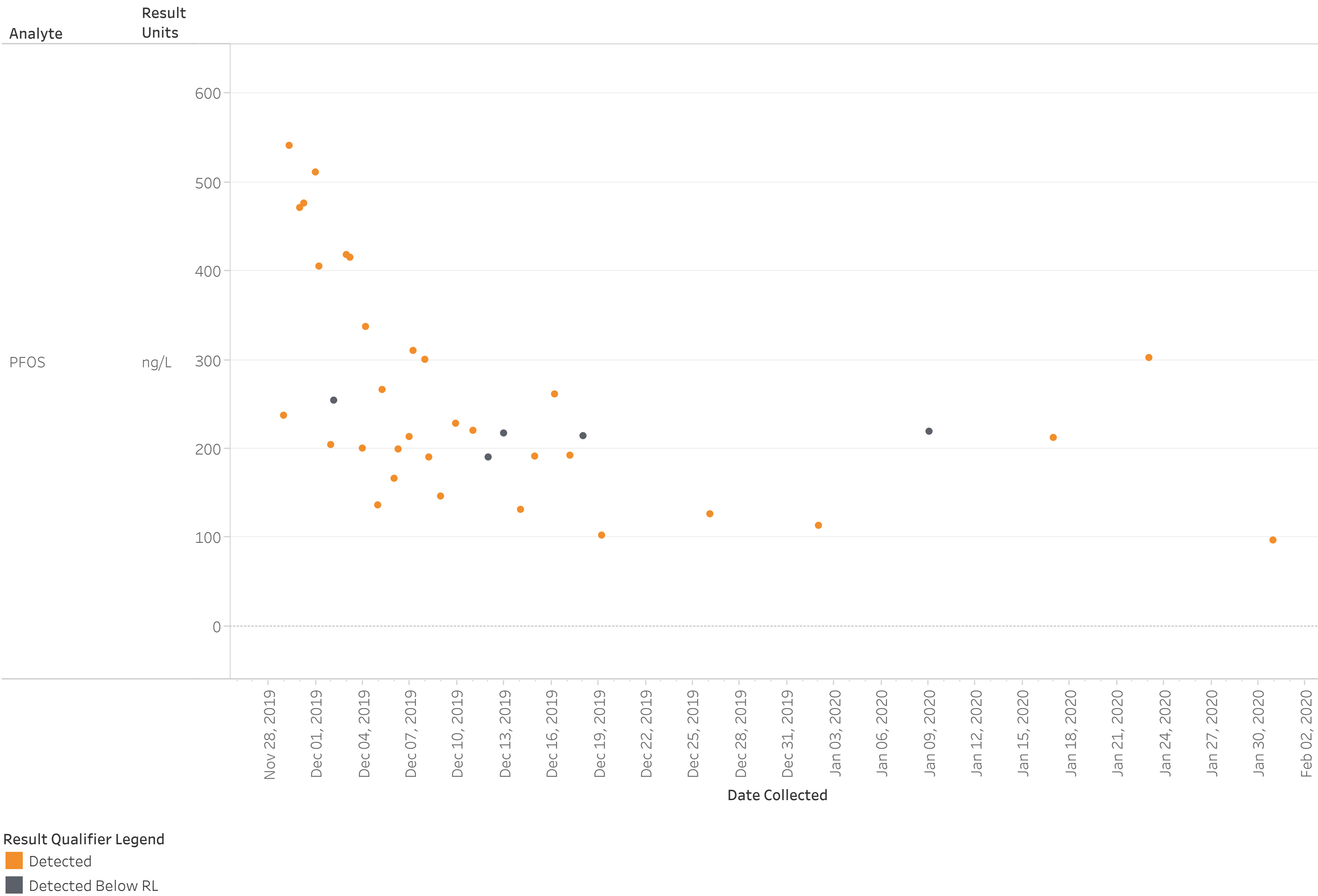
Analytical Water Result Trends - WS002

Neches River Basin Permitted Discharge Outfall 004



Analytical Water Result Trends - WS002

Neches River Basin Permitted Discharge Outfall 004



Appendix H – SCAT Report

December 2 – December 4, 2019

South Group 4 Fire
SCAT Team Daily Summary

(SCAT = Shoreline Cleanup Assessment and Technique)

Activity Date: 12/5/2019
Prepared by: Robert Simmons, SCAT Coordinator, CTEH

SCAT Team 1 Lead – Ernie Shirley, CTEH

Participating Team Members, Stakeholders, Other

- Abel Garcia-TCEQ
- Paul Gracianette-CTEH
- Heather Biggs-TP&W

SCAT Team 1 Activity Today: Team primarily acted in SCAT-Ops Liaison mode and monitored cleanup operations in Divisions A & B and coordinated with Ops personnel regarding cleanup progress and status in advance of establishing Unified Command cleanup endpoint standards and assessment process.

Significant Comments/Observations:

- Cleanup crews were cutting and bagging low hanging obstructing vegetation and flushing oil and oily debris in Division A.
- Snare deployment appears to be effective in collecting the accumulated emulsified product at boom emplacements.
- Some point observations were collected in Div E between the pumps and Atlantic Road where some possible shoreline oiling was observed as the water level has fallen.
- TP&W rep conducted wildlife surveys.

General Comments:

- SCAT Coordinator working to develop a Unified Command Cleanup transition and endpoint and final assessment protocol Plan for Divisions A-E.
- See attached graphic showing Point SCAT oiling observations from 12/2/2019 to 12/4/2019.

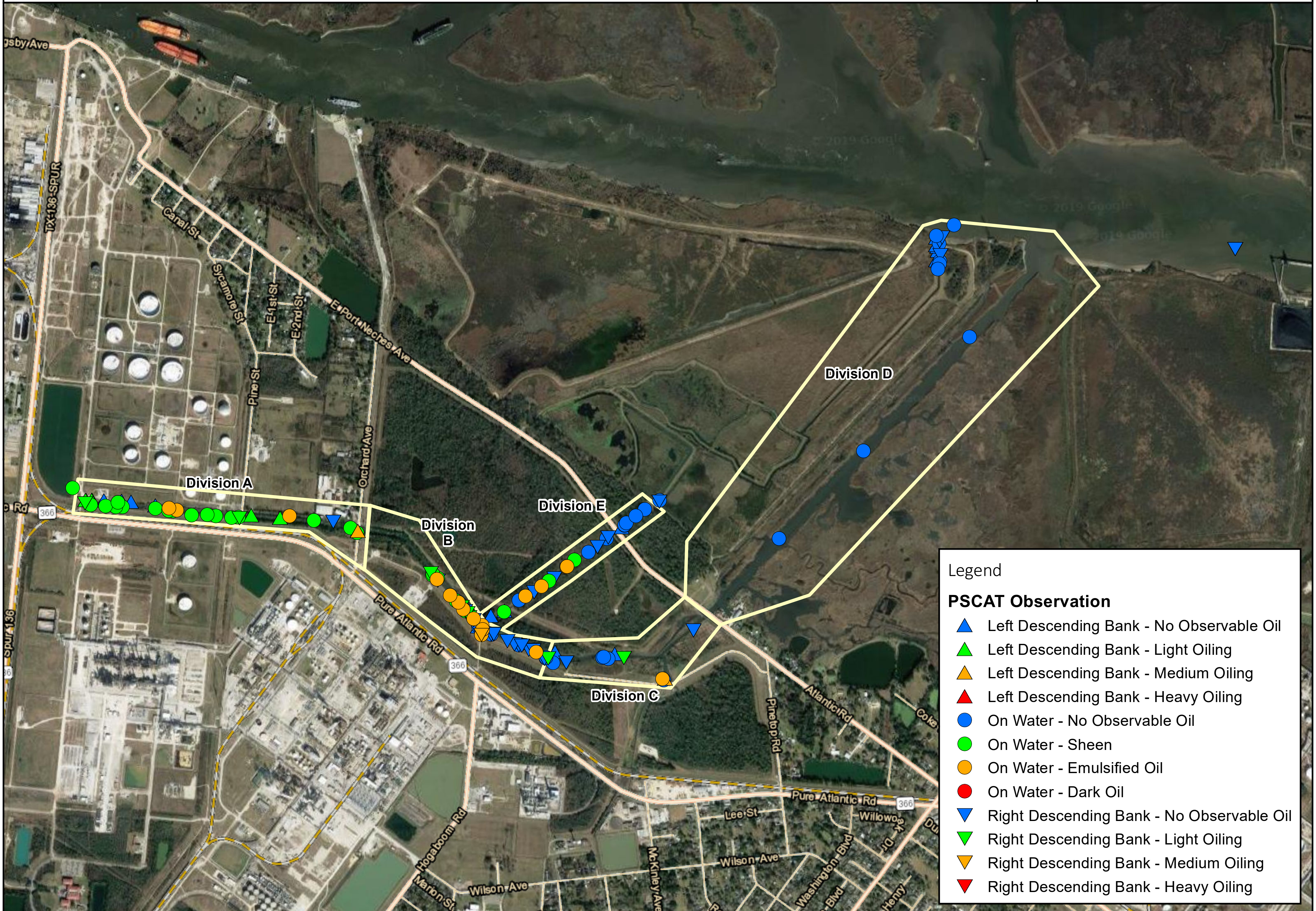
Planned Activity for Tomorrow: Team 1 to continue to act in SCAT-Ops Liaison mode. No point observations anticipated to be collected unless specific circumstances warrant.

Rapid Shoreline Assessment

South 4 Group Fire | Port Neches, TX | December 02, 2019 - December 04, 2019

0 0.25 0.5 Miles

Project: 112312
Client: TPC Group
City: Port Neches, TX
County: Jefferson



COORDINATE SYSTEM: *NAD 1983 StatePlane Texas North Central FIPS 4202 Feet* **DATUM:** *North American 1983* **LAST UPDATED:** *12/5/2019 4:04:50 PM*